

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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A New Coal and Ore Elevator.

In hoisting coal, ore and other substances by means of endless chains and buckets, a steady movement of the former, without jerking or slipping, is most desirable and of great importance. Chains made of common flat-iron links render such movement very difficult and often impossible, and though a large number of devices have been introduced from time to time, there was still room for further improvements, better contrivances, with a more nearly perfect action, being certain of finding a ready market. With the view of meeting the existing demand, Mr. S. Stutz, of Pittsburgh, Pa., constructed the simple but effective elevator, of which we here give engravings, the apparatus embodying all requisites which insure a continuous and regular working. A side view is given in Fig. 1, Fig. 2 being a partial front view, more clearly showing the minor details, some of which are given on a larger scale in Figs. 3 and 4. The chains, which are composed of malleable iron links connected by pins or by bolts and nuts, are provided with projections, *r*, which regularly and at the proper time are taken up by corresponding teeth, *t*, of polygonal pulleys, *P*, as shown in Fig. 1. The chain is carried around with the pulley, being perfectly secured, no slipping being possible till it arrives at the rear where it is allowed to leave the teeth. Rods, *A* (Fig. 2), reaching across from one chain to the other, support the buckets, *k*, which are kept in place by nuts and pieces of gas pipe, inserted between the buckets and links. The lengths of the latter differ according to the sizes of the former, but in every case they are well proportioned, having large wearing surfaces at their connecting points. The pulleys *P* have independent angle-pieces, carrying the teeth *t*, which are riveted to the separate sides and may be easily replaced in case of accident or when worn out. Should it be desirable, the teeth may be cast in a single piece with the pulley, and in this case advantages are offered in some points, which are, however, perhaps counterbalanced, if not exceeded, by the advantages resulting from the use of separate teeth and pulleys. Pillow blocks, supporting the latter, are fixed upon guide plates, *C*, and can be lowered or raised, if necessary, by means of the set-screws *s*. The elevator here shown is inclined at an angle of 60 degrees, and is provided with half-bushel buckets, fixed to 5-inch links. Motion is transmitted by the pulley *D*, and the material is carried from the bin *G* to the chute *F*. Mr. Stutz has also patented a vertical elevating apparatus, one form of which has quarter-bushel buckets attached to 5-inch links. In this elevator the chute must be placed outside the buckets, allowing free passage for their return, and in order to properly direct the passage of the material, the inventor has introduced a special arrangement of inclined planes fixed to the polygonal pulleys. These planes revolve steadily, and, being always in front of the full buckets, receive the material and let it slide into the chute. Elevators of this kind may be employed to raise or deliver material to almost any distance, either horizontal or vertical, as the case may be. Attention should, furthermore, be called to the coal and ore-crushing and washing machinery introduced by Mr. Stutz, who is prepared to furnish all necessary appliances for a complete plant. The prominence of Mr. Stutz in the construction of such machinery as here mentioned and described, is probably the best recommendation for the efficiency and reliability of their action.

The Legal Status of Express Companies.

In the United States Circuit Court, St. Louis, February 23, Judge Treat read a decree rendered by Judge McCrary, in Chambers, in the case of the Southern Express Company vs. the St. Louis, Iron Mountain and Southern Railway Company. In connection with the decree of Judge McCrary was forwarded the opinion of Justice Miller, on which the decree was based, and on which similar decrees will be made in all the other cases, of which there are quite a number. The decree is dated February 21, 1882, and it orders that the injunction hereinbefore granted shall remain in full force until otherwise ordered by the court. Justice Miller's opinion is not of great length, and embraces five suits—the Southern Express Company against the "Iron Mountain;" the same against the Memphis and Little Rock Railroad; Wm. B. Dinsmore, president Adams Express Company, against the Missouri, Kansas and Texas Railway; the same against the Atchison, Topeka and Santa Fe Railway; and the same against the Denver and Rio Grande Railway.

Justice Miller, in the document transmitted to Judge Treat, says that the express business is a branch of the carrying trade that has, by the necessities of commerce and the usages of those engaged in transportation, become known and recognized. The general character of the business is sufficiently known and recognized as to require the court to take notice of it as distinct from the transportation of the large mass of freight usually carried on steamboats and railroads, such as grain, flour, iron, ordinary merchandise and the like. It is one of the necessities of the business that the small and valuable packages, &c., carried by the express companies, should be in the immediate charge of an agent or messenger of the person or company engaged in it, and to refuse

permission to this agent to accompany these packages on steamboats or railroads on which they are carried, and to deny them the right to the control of them while so carried is destructive of the business, and of the rights which the public have to the use of the railroads in this class of transportation. When express matter is so confined to the charge of an agent or messenger, the railroad company is no longer liable to all the obligations of a common carrier, but that when loss or injury occurs, the liability depends upon the exercise of due care, skill and diligence on the part of the railroad company. Under the circumstances there does not exist on the part of the railroad company the right to open and inspect all packages so carried, especially when they have been duly closed or sealed up by their owners, or by the express company. It is the duty of every railroad company to provide such conveyance by special cars, or otherwise, attached to their freight or passenger trains, as are required for the safe and proper transportation of this express matter on their roads,

insist upon the payment in advance, or at the end of every train, would be to enable them to defeat the just rights of the express companies, to destroy their business, and would be a practical denial of justice. To avoid this difficulty I think the court can assume that the rates or other modes of compensation heretofore existing between any such companies are *prima facie* reasonable and just, and can require the parties to conform to it as the business progresses, with the right to either party to keep and present an account of the business to the court at stated intervals, and claim an addition to, or rebate from, the amount so paid. And to secure the railroad companies in any sum which may be thus found due them, a bond from the express company may be required in advance. When no such arrangement has heretofore been in existence, it is competent for the court to devise some mode of compensation to be paid as the business progresses, with like power of final revision on evidence, reference to master, &c. I am of the opinion that neither the statutes nor con-

cerning the situation is by no means reassuring. On the B. and M. R. Railroad at Omaha the disturbances assumed the proportions of a riot, the militia were summoned to assist the civil authorities in keeping the peace, and one death has already resulted from collision between those who are attempting to enforce and those who are violating the law. In Lawrence, Mass., a large strike is in progress among the mill operatives; the cause, an attempted reduction in wages. In Fall River the wage question is the theme of discussion before the spinners' union. There are rumors of a strike at Troy among the stove molders, and one has but recently been settled at Pittsburgh. In the building trades there is a feeling of discontent all over the country, and demands for 20 to 40 per cent. advance in wages over those paid last year are by no means uncommon. It may be said in passing that this demand is having a tendency to check building operations.

Part of this movement is no doubt due to the approach of pleasant weather. As we

need of a large number of glass tubes, and since this article was exceedingly dear in France at the time, and the duty on imported glass tubes was something alarming, Humboldt sent an order to Germany for the needed articles, giving directions that the manufacturer should seal the tubes at both ends, and put a label upon each with the words "Deutsche Luft" (German air). The air of Germany was an article upon which there was no duty, and the tubes were passed by the custom officers without any demand, arriving free of duty in the hands of the two experimenters.

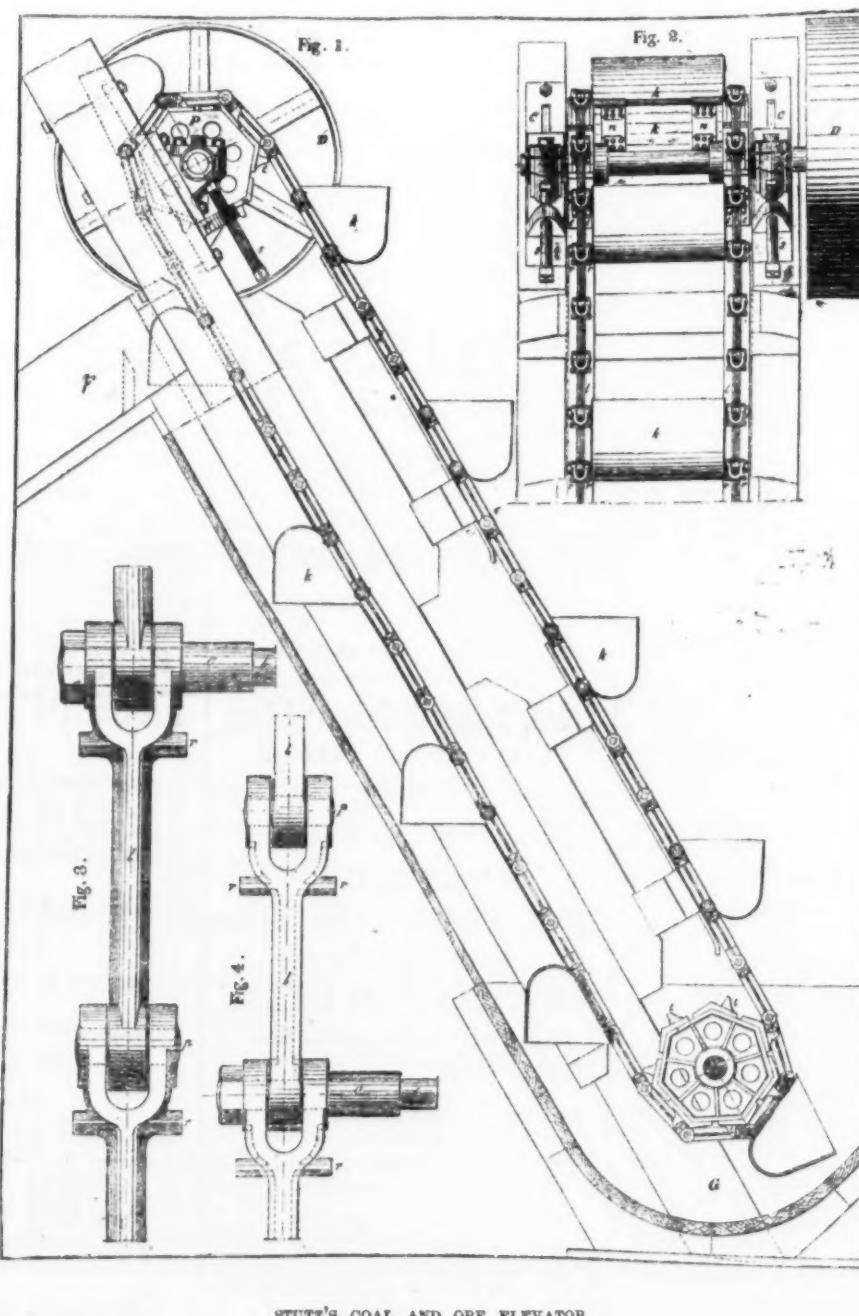
The Paris World's Fair of 1878.

Two large volumes have just been laid before the French Chambers, containing the accounts of the Paris Exposition of 1878. They will be found of absorbing and melancholy interest by the taxpayers, as, instead of a deficit of \$2,000,000, one of more than thrice that sum has to be made up. Some of the statistics presented are worth preserving. There were 16,102,089 visitors to the Exposition, as against 9,062,965 in 1867, and the receipts from admissions were \$2,675,927.68, while the concerts brought in \$14,489.20, and the sale of the catalogue \$23,722.47. (The catalogue never was completed thoroughly, owing to the neglect of some of the foreign commissions.) The sale of materials produced \$688,177.97, and, with the sale of privileges, the subsidy from the city of Paris, &c., the total receipts were brought up to \$4,570,000, or nearly \$200,000 less than the estimates. The expenditure was estimated at \$7,062,600, but it went up to \$11,155,000, owing to the unexpected success of the project. The cost of direction and attendance was more than doubled, that of the building was increased by nearly \$1,000,000, and so on all along the list. There were 52,835 exhibitors in all. Of the 26,963 from foreign parts, Spain led with 453; then came Austria and Hungary with 393, and England with 314; Japan sent 430 and China 436. There were awarded 29,810 medals and diplomas and 295 premiums for fatted cattle. The cost of the aquariums and cascades was \$560,000, of water elsewhere and gas \$182,800. There were reported 175 thefts, nearly all of which were insignificant, and 130 of the rascals were arrested. Of these 96 were French, 14 Italians, 5 Turks or Syrians, 4 Spaniards and 4 Englishmen, a showing which should suffice to explode that famous legend of "hundreds of English pickpockets" flocking to Paris. Though there is a deficit of \$6,255,000 to be met, the Exposition need not necessarily be regarded as a losing speculation even for the Government. The lodging-houses received during the time the Exposition lasted 218,622, or thrice the usual number; the five great lines of railroad carried to Paris 12,154,905 travelers, an increase of 2,602,491, and the receipts of the *bus* and penny boats were greatly increased. The receipts of the theaters for the year were \$3,714,600.

Blast Furnaces in Sweden.

Down to the commencement of this decennium there was only one place in Sweden where two blast furnaces were in operation at one time, the materials being, as a rule, insufficient to keep even a single furnace in uninterrupted working during the whole year, owing to the difficulty of collecting charcoal and ores. All the necessary material must be brought to the furnaces on sledges, and the former are, in consequence, generally not blown in until sledging can commence. The longer the snow lasts, the larger is the stock of materials which an ironmaster can lay in, and it will, therefore, readily be seen that the length of time during which the furnaces are kept in blast depends, in a great degree, on the nature of the winter. It is possible in only few places that a sufficient quantity of charcoal and ore may be stored to keep the furnace going till the sledging season again commences, and they are, therefore, generally blown out in the middle of the summer. There are, however, exceptional instances of furnaces having been kept in blast from three to six years. Lately, however, as the means of transport have improved by railway communication, &c., new blast furnaces have been erected, so that there are now in some places two and in others even three in operation. Through improved means of transport the production of pig iron in Sweden has naturally become less dependent on the quantity of snow which falls in the winter; still good sledging is even now a principal condition for an increased production of iron, as the charcoal kilns in the interior of the forests are only accessible when the water courses are covered with ice, and the snow renders the trackless forests passable. It is, accordingly, only during such a time that charcoal can be got out to railways or other lines of communication. The furnace workers are generally paid by piecework, and a foreman is said to earn, as a rule, from 40 to 75 cents per day, while an ordinary workman receives from 30 to 60 cents. The cost of labor for the making of pig iron varies somewhat, but is generally about 6 cents per cwt., or about \$1.50 per ton, which includes the cost of calcining and crushing the ores.

It is reported that Krupp has added 8000 recruits to his industrial army, which now numbers 40,000.



STUTZ'S COAL AND ORE ELEVATOR.

and that the use of these facilities should be extended on equal terms to all who are actually and usually engaged in the express business. If the number of persons claiming the right to engage in this business at the same time on the same road should become oppressive, other considerations might prevail; but until such a state of affairs is shown to be actually in existence in good faith, it is unnecessary to consider it. This express matter and the person in charge of it should be carried by the railroad company at fair and reasonable rates of compensation, and where the parties concerned cannot agree upon what that is, it is a question for the courts to decide. A court of equity, in a case properly made out, has the authority to compel the railroad companies to carry this express matter and to perform the duties in that respect already indicated, and to make such orders and decrees and to enforce them by the ordinary methods in use necessary to that end. The learned justice says: "While I doubt the right of the court to fix in advance the precise rates which the express companies shall pay and the railroad companies shall accept, I have no doubt of its right to compel the performance of the service by the railroad company, and after it is rendered to ascertain the reasonable compensation and compel its payment. To permit the railroad company to fix upon a rate of compensation which is absolute, and

stitution of Arkansas or Missouri were intended to affect the right asserted in these cases; nor do they present any obstacle to such decrees as may enforce the rights of the express companies."

Labor Troubles.

With the return of spring there is a manifest increase in the number and importance of strikes. In the iron trade the most important one is that at Homestead, near Pittsburgh, at the works of the Pittsburgh Bessemer Steel Company, Limited. At this place a spirit of lawlessness has existed, and men and officers have been brutally beaten and shot at while in the discharge of their duty. It is asserted by the union that the men guilty of these outrages are not unionists, and we do not believe that the better men of the union are cognizant of them, but that some of the strikers are the perpetrators seems evident. Indeed, one striker has just been convicted of assault. In the coal regions an extensive strike of 3000 miners has just been inaugurated at Cumberland, Md., against a reduction of wages, and 200 mines are idle. In Ohio meetings are held by the miners that look to a stoppage of work. In the Lehigh district of Pennsylvania the men have been reduced to half time, and consequently half wages, and though no strike is

have already often stated, it is not the policy of workmen to strike in winter if it can be avoided. Work is scarcer, fuel, clothes and food higher, and a larger quantity necessary than in summer or even in spring. A part is due to the necessity in many cases of additional wages. It is no doubt true that wages have not followed the advance in prices of products and of living as closely as they might. But the chief indication of these labor movements is of an unstable equilibrium in business. Some of these strikes are for an advance, some against a reduction. If all or most were one way it would indicate a decided tendency of business up or down, but with a divided tendency it shows an uncertainty, a lack of definitives that indicates doubt as to the future—in a word instability. These indications cannot be ignored by either side. The situation is one that calls for wisdom, not passion; cool, deliberate judgment, not hasty, ill-advised action.

A German newspaper some time ago related an amusing story of the famous scientist, Alexander von Humboldt, who took advantage of the exemption from duty of the covering of articles free from duty, formerly the rule in France. In the year 1805 he and Gay-Lussac were in Paris, engaged in their experiments on the compression of air. The two scientists found themselves in

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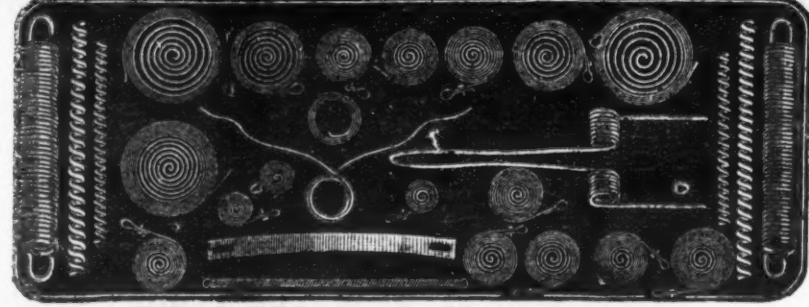
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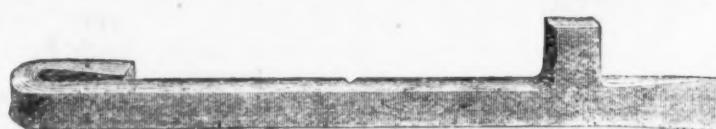
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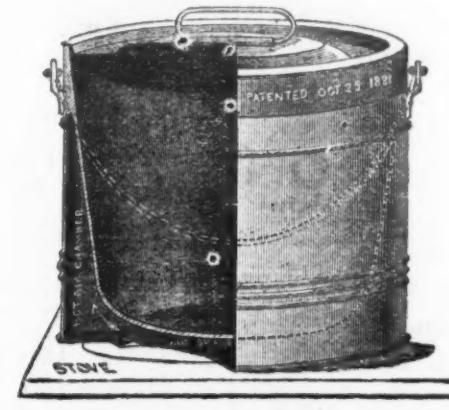
Universal Cooking Crock.

The accompanying cut represents a novelty in the shape of a cooking utensil, which in itself combines all the advantages of a metal vessel with those of the article of porcelain-lined metal. It also has many desirable points of its own. It is called the Universal Cooking Crock, and consists of a crock or earthenware vessel set into a band of sheet metal, which supports its bottom within perhaps $\frac{1}{4}$ inch of the surface of the stove. The crock itself is of a peculiar kind of earthenware, glazed upon the inside in a manner similar to the chemical ware used by druggists. The cut shows a half section of the vessel as it would appear when sitting upon a stove. It will be observed that the crock flares, which makes an air space between its side and the surrounding Russia iron sheath. This protection, it is said, makes the crock a better heater than a similar vessel sitting directly upon the stove surface, but without the sheath. This construction has one very peculiar advantage in that it is said to be impossible to burn food cooked in such a crock. This does not mean that if food, like oatmeal or cracked wheat, is allowed to dry thoroughly it will not burn, but simply that it will not "burn on the bottom" while there is any respectable degree of moisture remaining. The efficiency of a double bottom was long ago

that was going on at Gatun can hardly matter a great deal. The few small houses that were going up there can be finished at any time; some of them are already finished.

Thermometers for Low Temperatures.

Experiments made at the Meteorological Observatory at Kew, England, have shown that ordinary thermometers are very inaccurate below the freezing point of water, and that the low temperatures announced as having been produced by refrigerating machines for freezing meat on board ocean-going steamers are liable, in many cases, to serious questioning. Some of the thermometers have been found to be inaccurate to the extent of more than 50° F., and one was 100° out. A thermometer, a relic of one of the earlier Arctic expeditions, was recently tested at Kew. At -40° F. it was 15° out, and at -100° F. it was 30° wrong. The demand for trustworthy thermometers for circumpolar and northern meteorological stations, as well as for meat-freezing machines and various scientific purposes, has induced the authorities at Kew to test the instruments at the temperature of melting mercury, the air thermometer being used for lower temperatures should exceptional circumstances require it. The freezing point of mercury— 37.9° F., was first determined by Dr. Balfour Stewart, and his



Universal Cooking Crock.

demonstrated in a most conclusive manner by Count Rumford, who made very many successful cooking utensils, both of large and small size, in this way. The Universal cooking crock, though not having a double bottom, actually applies the same principle of an air space beneath the crock, making the heating surface of the stove perform the part of a lower bottom. To prevent the cracking of the crock it must never be placed directly over the fire, as this will practically defeat the purposes of the invention, and at the same time expose the crock itself to such a test as no earthenware can be expected to bear. The article is manufactured by the Universal Cooking Crock Co., 9 Burling Slip, New York.

observations were subsequently confirmed by other observers. Between the freezing points of water and mercury no intermediate fixed point is known, although methyl chloride is supposed to furnish one. It is difficult to get this chloride in a solid state.

At a recent test of a thermometer to be used with meat-freezing apparatus, about a pint of mercury was poured into a wooden cup, which was covered with boiler felt besides having an outer covering of wood. Solid carbonic acid was made in the usual way, by the evaporation of some of the liquid carbonic acid from an iron bottle, into which 200 gallons of the gas had been compressed. Lumps of the solid acid were then placed on the surface of the mercury, a little sulphuric ether was poured over them, then the lumps were pressed down into the mercury with a wooden spoon. This produced a hissing and a bubbling from the escape of carbonic acid gas. After the operation had been several times repeated, lumps of solid quicksilver began to form; some of them, rich in gas bubbles, floated at the top; others sank to the bottom, for mercury, unlike ice, is heavier than the liquid in which it is formed. The lumps, some of them hard and some soft, were constantly broken up as much as possible with the wooden spoon, the great object being to get a thick layer of soft mercurial paste at the bottom of the vessel, in which to plunge the thermometers during the observations. The whole operation appeared to the onlookers to be simple and easy enough, although in the last generation the freezing of even a small piece of mercury was considered a wonderful feat. Four standard Kew thermometers were then placed in the mercurial paste, and those to be tested were inserted alongside, their errors in indication being written down on paper. The possibility of all four of the Kew thermometers going wrong at once is not to be supposed, consequently the values of the indications of the thermometers on trial are well tested.

Work on the Panama Canal.

A Panama letter of February 11th to the New York Herald, gives a desponding account of operations by the Lesseps Canal Company. The writer says:

Going back to the beginning of last year I cannot help thinking that if the company are in earnest about pushing the work excavations might now be progressing on a large scale, instead of which there is, in reality, nearly next to nothing done. Some material has been brought out and dumped on the beach. A few small houses are being erected at Gatun, Emperador and one or two other points. The Grand Hotel has been purchased and filled by officials. The expensive toy of a fancy hospital is going up, the engineers are still studying the ground, and this is about all that has been accomplished with the first \$15,000,000 of the shareholders' money. At this rate 1,000,000,000 francs will not half build the canal. It has been shown, however, that out of his first \$60,000,000 M. de Lesseps, after paying off outstanding scores, will have only \$12,500,000 to work with. Supposing that he does get the loan of an equal amount, this would make but \$72,500,000, and even he, sanguine as he is, does not contend that this sum would suffice to finish his task. Where, then, is the difference between this sum and the \$140,000,000 which he says he needs to come from? This difference is only a small item of \$67,500,000. Admitting that all the first \$60,000,000 be paid up, a thing which is by no means certain, it is hard to believe that the shareholders will consent to mortgage their interests in favor of parties who, up till now, have risked nothing, in order to get a second \$60,000,000 to carry the enterprise through, although if they did make such a sacrifice it would avail them nothing. The situation is, therefore, becoming difficult, and men who find themselves embarked in the speculation will be likely to consider that their best way out is to leave it now.

From the company's officials it is impossible to find out whether or not the second call for 125 francs per share, payable between January 2 and 15 of this year, has been fully responded to. I am informed, upon what seems good authority, that the call has been only partially successful. My informant assured me that the King of the Belgians has withdrawn himself from the enterprise. His Majesty was one of the heaviest shareholders in it. The same party also states that many of the shareholders' friends, who were sent out to fill positions on the isthmus, wrote home very discouraging accounts as to how things were going on, and that these stories had a disastrous effect upon the company's financial prospects. As if to confirm this piece of evil news for the company, I hear that they have suspended the work at Gatun under the pretext that the Huener, Slaven & Lynch contract will cover that point. This contract has not been signed up till the present, but there can hardly be any doubt that it will go into effect. At all events, the suspension of the very little work

Large Slitting Machine.—An exceptionally powerful slitting machine, especially designed for marine-engine work, has recently been completed by Messrs. Craven Brothers, of Manchester, England. The total weight of the machine is 70 tons, and the maximum stroke of ram is 10 feet, with a minimum stroke of 9 inches. The distance from the face of the ram to the frame is 6 feet 6 inches, and the total height from ground line, when working its longest stroke, is 30 feet. The machine can be worked at equal speed in the cutting and return strokes, or the return stroke may be accelerated to double that of the cutting stroke when the work will admit. The self-acting motions are all variable from four to sixty-four cuts per inch, and besides these, the slides and rotary table can be moved in either direction by power, at the rate of 8 feet per minute.

In an official report by Mr. Edward Atkinson and Mr. William B. Whiting, of Boston, they mention with much satisfaction the fact that more attention is now being paid to careful construction of buildings. They also state that the old stock of combustible churches, hotels, schoolhouses, hospitals and asylums is being consumed at an unusually rapid rate. In previous years this destruction has been at the rate of one church per week, and one hospital, almshouse, insane asylum or schoolhouse per month. In 1881 this was very much exceeded. In their concluding remarks they appear to think that if this rate is kept up for a few years longer, a salutary lesson will be taught, the old stock of combustible buildings be reduced and a new stock take their place more in accordance with our present knowledge of the art of fire-proof construction.

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The Crown Point Furnace.

In a recent letter to the Secretary of the American Iron and Steel Association, Messrs. Taws & Hartman, of Philadelphia, state that the Crown Point Iron Company, of Crown Point, N. Y., have enlarged their No. 2 furnace and run it for five weeks. The furnace is equipped with new regenerative stoves and a new blowing engine, the latter being different from any heretofore built. It is a vertical condensing engine with a blowing cylinder 90 inches in diameter, and a steam cylinder 72 inches in diameter, the stroke being 7 feet. The size of the steam cylinder is unusual, but it is the cause of its economy in steam, this being shown by the existence of surplus of the latter, a thing that never before occurred with the same burden. The maximum pressure blown for a short time was 23 pounds per square inch. The engine has been run with 18 pounds continuously for 12 hours without the journals heating or the engine showing signs of over-work. The engine was built by the I. P. Morris Co., of Philadelphia, and is fitted with Wanich's patent poppet valves, which effectively prevent the breaking of cross-heads or steam-cylinder heads by water. The capacity of this engine is 12,000 feet of air per minute, and it is guaranteed to blow 20 pounds to the inch. When blowing 12,000 feet of air per minute at 8 pounds pressure only one-third of the power of the engine is derived from the boilers. The other two-thirds are derived from the vacuum produced by condensation, which practically costs nothing. This makes it the most economical blowing engine on record. With a given size of blowing cylinder, say 90 inches, and a steam cylinder 45 inches (which is the proportion generally used), and blowing 8 pounds per square inch, more steam will be used and less vacuum power will be obtained than with a 72-inch steam piston. More water is required for condensation with a 45-inch piston than with a 72-inch piston when the same power is developed.

Experience shows that surface condensers attached to blowing engines produce a better vacuum than the old jet condensers. The surface condensers add 10 per cent. to the cost of the engine, but they keep the boilers clean, thus preventing the frequent stoppages for cleaning. With the modern rapid driving of blast furnaces the pressure of blast has steadily increased, requiring larger and more powerful blowing engines. When from any cause the balance of heat in the hearth of a furnace is lost the pressure of blast increases rapidly, and unless there is sufficient power in the blowing engine to force the blast through the stock, the furnace must go through a sieve to restore the heat to the hearth, or it must be shoveled out. Since regenerative stoves have come into use the amount of fuel used to the ton of iron made has decidedly decreased. This decrease of fuel makes the escaping gas from the furnace poorer in carbonic oxide, and it consequently has less heating power. As the pressure of blast has increased, as above stated, more gas is required than heretofore to generate the steam to give this increased pressure, while the gas at the same time is poorer in burning power. This extra requirement is partly met by the use of economical condensing engines, but principally by the great saving of gas in the use of regenerative stoves. It takes no more gas to heat the same volume of air 1200° in a regenerative stove than it takes to heat it 900° in the cast-iron stoves. The escaping gas from iron pipe stoves is about 1800°, while the escaping gas from regenerative stoves is about 400°. In the event of a loss of heat in the hearth regenerative stoves will heat the blast hotter, which will quickly restore the heat to the hearth if the blowing engine is powerful enough to force the blast through the furnace.

Our iron shipbuilding yards are all fully occupied, inasmuch that some of them cannot for the present accept further contracts. At Chester, Mr. Roach employs about 1800 men, and has seven or eight vessels on the stocks. Messrs. Cramp & Sons have five or six vessels in progress. At Wilmington, Del., the same activity prevails. The Harlan & Hollingsworth Company employ about 1500 men, and are about laying three more keels, including one for a steamer of 4000 tons, and the Pusey & Jones Company have six steel and iron steamers under way for South America. Any of those firms can put up a ship ready for launching in four months. With remunerative freights in the American merchant marine, the Delaware River would soon become another Clyde. It is fortunate that an influential committee in Congress, whose business it is to report respecting the expediency of finishing the five naval iron-clads now rusting on the stocks, have had an opportunity to learn what is going on.

Experiments designed to show the efficacy of oil in allaying a troubled sea, have recently been conducted at Peterhead, England, and other fishing ports, with most satisfactory results. At the time of the experiments the wind blew from the southeast, and the waves were so high, and broke with such force, that the signal indicating danger to boats crossing the harbor bar was hoisted, while a tug boat, with a vessel in tow, had to "stand off." On the waters thus agitated the oil was spread from three submarine valves, on piping ranged along the sea floor, to the extent, it is said, of only two or three gallons, and, in the course of half an hour the whole expanse of water, from the tidal run to the harbor entrance, was coated with a uniform film of oil. Over this expanse the waves, although advancing at their full height outside the bay, ran their course in gentle undulations, the tug and its attendant vessel, meanwhile, passing safely in and other boats gliding safely out of the harbor.

Les Mondes reports that M. Dufour has in the exposed court of his house two bars of iron planted in the earth, to each of which is fixed a conductor of coated wire, terminating in a telephonic receiver. He consults the apparatus twice or thrice every day, and it never fails through its indications of earth currents to give notice of the approach of a storm twelve to fifteen hours before it actually arrives.

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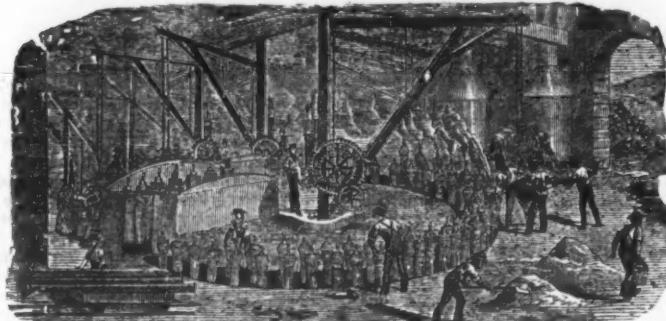
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FOR WATER AND GAS.

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Warranted Equal to any Produced.

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6

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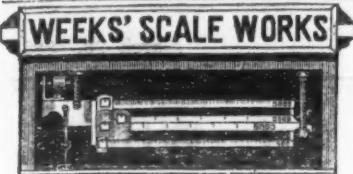
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No Weights to be Lost or Stolen.
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**IRON WIRE, SIEVES AND
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Galvanized Twist Wire Netting,
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Manufacturer of
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The cheapest and most
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Full size of Band for Brass and Tinned Wire Cages

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Seneca Falls, N. Y., U. S. A.,
Manufacturers of

**500 STYLES OF HAND AND POWER
PUMPS,**
FOR ALL PURPOSES AND USES.
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Manufacturers of
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MOLDING SAND
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Gothic Figures, 16 in. or less, \$1 per set; 26 in.,
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Alphabets, three times as much.
Old stamps repaired and new ones made promptly. Send for
price list. CLEVELAND STAMP AND DIE CO.,
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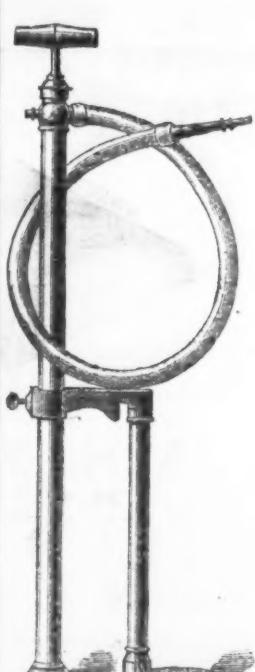
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Also, manufacturer of the easy
running Pendulum pump for small
power.



METALLURGICAL NOTES.

PROPERTIES OF MALLEABLE NICKEL.
We have on previous occasions noted the
efforts which have been made from time to
time to manufacture malleable nickel. M.
Garnier, of Paris, claims to have succeeded
in making malleable nickel by the addition
of 0.3 per cent. of phosphorus or manganese.
Credit is also due to Mr. Fleitmann, of Iserlohn,
Germany, for considerable work done in this
direction. He adds 1-10th to 1/2 per cent.
of magnesium, and has found that he can
weld the nickel thus obtained to iron and
steel and roll it out in sheets, and shape it
into tubes and pipes. Dr. Collmann has
made a series of tests of the solid malleable
nickel produced by the Fleitmann process
with the following results: A 0.465 inch
round bar showed a limit of elasticity of
59,741 pounds, a tensile strength of 96,083
pounds, with an elongation of 17 per cent.
and a contraction of area of 50.6 per cent.
A second one, 0.44 inch in diameter, had
an elastic limit of 40,609 pounds, a tensile
strength of 78,957 pounds, an elongation
of 20.25 per cent. and a contraction of area
of 45.5 per cent. Nickel wire, 0.01615 inch
in diameter, broke under a load of 1565
pounds.

A NEW QUARTZ CRUSHER.

Another addition has recently been made
to the long list of quartz-crushing contrivances
now in the market. It is the invention
of Charles P. Stanford, of San Francisco,
and consists of a circular flat-bottomed mortar,
properly secured to a foundation or
mortar block. Within this mortar is the
crusher or pestle, this being a heavy metal
block, having peripheral dies securely bolted
to its under surface. The mortar is large
enough to easily contain the pestle, besides
allowing considerable play. The frame of
the contrivance is provided with cross guides,
in which a vertical shaft is properly sup-
ported. This shaft has secured to it a crank
arm, through the outer end of which the
stem or handle extending upward from the
pestle loosely passes. Since the shaft is
directly over the center of the mortar each
revolution causes the stem of the pestle to
describe a circle outside of its vertical cen-
tral line, thus tilting the pestle upon each of
its dies successively, causing a crushing and
grinding of the matter in. The whole weight
of the pestle is thrown upon each die as it is
tilted by the revolving crank, and as the
faces of the dies are made in a plane tangen-
tial to the radial line of the movement of the
pestle, a series of flat surfaces of the dies,
parallel to the flat bottom of the mortar, in-
termittently strike the ore percussively.
The stem, by passing loosely through the
crank is not revolved upon its own axis, and
consequently the pestle does not turn in the
mortar.

CAESIUM AND RUBIDIUM.

A careful study of some new caesium and
rubidium compounds was recently made by
Carl Setterberg, who succeeded in preparing
metallic caesium from the chloride by means
of electrolysis. The material was obtained
by working up residues from the preparation
of lithium compounds from lepidolite, large
quantities of this material being at his dis-
posal. The separation of pure salts was
effected as follows: Three to four hundred
weight of the impure alums (the residues just
mentioned) were dissolved in enough water
to make a solution of 20° B. when boiling.
The deposit from this solution contains all
the rubidium and caesium compounds. This
operation is repeated until the potassium
alum is removed. Then the crystallization
is continued and rubidium alum obtained
in pure condition. Finally, the caesium
alum is obtained. Thinking that possibly
other alkaline metals might be contained in
the mixture, the crystallization of the cae-
sium alum was continued until only a very
small quantity remained. No evidence of
the presence of new metals was obtained.
Mr. Setterberg prepared, in the course of
two weeks, some 88 pounds of rubidium
alum and 22 pounds of caesium alum. Ru-
bidium was prepared by distilling, after car-
bonizing, 3300 pounds of rubidium ditartrate,
330 pounds of calcium carbonate, and the
necessary quantity of sugar. The operation
was in every respect satisfactory. The at-
tempt to prepare metallic caesium by reduc-
tion of the carbonate with charcoal was not
successful. By electrolysis of caesium cyanide,
however, the metal was obtained, though only
in small quantity. It was found better to use
a mixture of four parts caesium cyanide
to one part barium cyanide, instead of pure
caesium cyanide. Caesium is very
similar to the other alkali metals floating on
water, and acting like potassium and rubidium
as regards the accompanying phe-
nomena.

ELECTRO-DEPOSITION OF TIN.

Improvements have recently been made in
connection with the manufacture of tin
plate with the view of reducing to practice
the tinning of the plates by electro-deposition
of the metal. In carrying out the im-
provement the inventor takes what are known
as "black plates" which have been
"pickled," annealed, cold rolled and again
"pickled" preparatory to being tinned.
These plates having been properly cleaned,
are immersed and rinsed in a bath of clear
water, and are then passed into the depositing
bath, being suspended from a rack frame or
dipping apparatus. The bath being
charged with plates, a dynamo-electric ma-
chine is set to work and tin will be deposited
upon the plates, the thickness of the deposit
varying according to the strength of the
current and the time of immersion. A
specially constructed resistance coil is put in
the circuit to regulate the strength of the
current. When sufficient tin has been de-
posited the plates are removed from the bath,
rinsed in hot or boiling water, and passed
into hot (hard wood) sawdust to dry the
surface, and for most practical purposes these
plates are bright and lustrous enough with-
out further treatment. If it be desired to
give the plates the appearance of frosted
silver, they are passed through fine wire
scratch brushes, but for giving a burnished
surface either a set of scratch brushes and
final buffing rollers are employed or two sets
of scratch brushes and a burnishing tool.
The apparatus for this polishing or finishing
purpose consists of a bed-plate mounted upon
suitable standards or framing. At the head

of the machine are bearings for carrying
and gear for driving a pair of cross shafts,
to be fitted with fine wire scratch brushes,
and at the opposite end of the machine a
second pair of shafts for scratch brushes,
with corresponding gearing, may be fitted or
not, according to the finish to be given to
the plates. After the first pair of scratch
brushes the plate in its passage through the
machine comes on to the bed-plate, which
has a polished steel surface; above this is
arranged in reciprocating slide bearings a
burnishing steel bar of rounded surface form,
to which a rapid to and fro motion is im-
parted across and upon the surface of the
plate under treatment, and strong lye water,
or other emulsive or softening liquor to facil-
itate the burnishing action is dropped upon
the plate during the progress of the work.
Plates having a deposit of so small a quantity
as 10 ounces of tin to the "box," that is,
a box of 112 sheets, 20 x 14, treated by
this scratch brushing and burnishing ma-
chine receives a surface and finish of brill-
iant, lustrous and continuous metal—that is,
the action of the burnishing tool, upon the
deposited surface presses out and together
any infinitesimal pores in the deposited metal
of the coating, so that the fiber of the metal
is perfect in its continuity, while the luster is
perfect. Instead of this mode of treatment,
a fair result can be obtained by passing the
tinned plates through polished steel or chilled
iron rollers running at speed in opposite di-
rections or at differential speeds. The plates
may also be finished by subjecting them to
heat sufficient to float the metal on the plates.
It has been found in practice that one of the
improved "Elmore" dynamo-electric ma-
chines will deposit the tin on about 500
"boxes" of plates, 21 x 14, per week. The
economy, simplicity and efficiency of this
process will, no doubt, be readily apparent
to those who best know the wastefulness of
the primitive dipping process.

VIRGINIA EXPERIMENTS IN COKE-MAKING.

It is reported that an enterprise of more
than ordinary interest has been started in
Virginia. American iron manufacturers are
generally of the opinion that coke made in
bee-hive ovens is superior for blast furnace
purposes to that made in more modern applica-
tions. The Iron and Steel Association of
Virginia has resolved to test the matter, and
is now putting down a plant of eighty of
Sodenhoff's modification of the Coppee coke
oven, of which a large number are in opera-
tion abroad. Hawk's Nest coal from Gaultoy
Mountain is to be coked, the builder guar-
anteeing that 95 per cent of the carbon in
the coal is to be converted into coke. It is
stated that the cost of the plant is only 35
per cent. greater than that of a line of bee-
hive ovens of equal capacity.

Mr. Patterson Muir gives this method for
detecting tin in the presence of antimony.
It is based on the fact that stannic chloride
is reduced to stannous chloride by boiling
with metallic copper. The precipitated sul-
phides of the arsenic group are warmed with
concentrated hydrochloric acid. The insol-
uble portion is washed and tested for arsenic
by Bunsen's film test. The solution is some-
what diluted; about three-fourths of it is
boiled for at least ten minutes with copper
turnings (which must, of course, be free
from tin), poured off from the copper, and
tested for stannous chloride by adding mor-
curic chloride. The remaining smaller portion
of the solution is poured on to a plate of
platinum, surrounded by a piece of zinc-foil.
If the platinum becomes covered with black
deposit it is removed and examined in the
ordinary way.

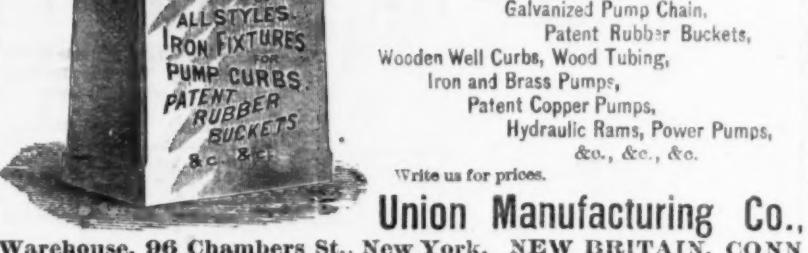
In a recent issue of the *Railway Age* it
was stated that 14 years ago the first steel
rails in America were laid on the Pennsyl-
vania Road, near Pittsburgh. In reply to
this, President Hinckley, of the Philadelphia,
Wilmington and Baltimore Road, says:
"The Philadelphia, Wilmington and Balti-
more Railroad Company laid 26 tons of John
Brown Bessemer steel rails in August, 1864,
or 18 years next August, and laid more or
less every year since. The greater part of
those 26 tons are still in the track." Mr.
Hinckley's statement that the rails made
almost 18 years ago are yet doing service on
the road is interesting. We should be glad
to note the results of careful chemical and
physical tests, as they would have an im-
portant bearing on points now in dispute.

An English exchange states that the quan-
tity of coal raised in the United Kingdom
during the year 1881 exceeds that raised in
1880 by over 1,000,000 tons. The quantity
raised in 1880 was 146,818,622 tons, and it
was far in excess of the production of any
previous year, the next largest production
being that of 1877, which was 134,610,763
tons. It was not till 1875 that the great in-
crease in the capital employed in collieries,
resulting from the high prices for coal ruling
in 1872-73, began to make itself felt. In
1873 the production was 127,016,747 tons,
and in 1875, 131,867,916 tons.

It is said that the Shah of Persia has
granted to a French company a concession
for the construction of a railway from
Teheran to Resht, on the Caspian Sea. The
work of construction is to begin in July of
this year, and to end in 1884. The company
is to pay about \$1,000,000 on the opening of
the line, besides a rent of about \$10,450
yearly for the period of the concession,
which is sixty years. In this country they
would want \$1,000,000 bonus, and a guar-
anty of 6 per cent. on their bonds for sixty
years.

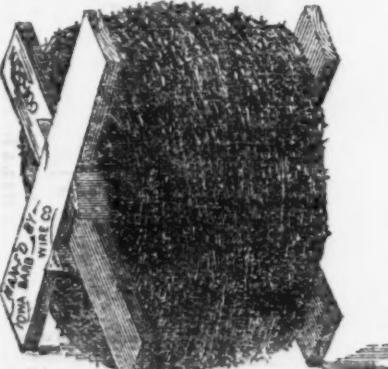
Plans for Lawler's railway pontoon bridge
to cross the Mississippi River at Reed's Land-
ing for the Chippewa Valley and Superior
Railway are now being prepared at Milwau-
kee. The bridge is to be similar in construc-
tion to the one at Prairie du Chien, except
that there will be a small span at each end.
It measures 400 feet in length, and will prob-
ably cost about \$100,000 when completed.
Mr. Lawler, its proprietor, says that it will
be the finest pontoon bridge in the country.

The Mayor of Minneapolis has vetoed an
ordinance which provided for lighting the
city by electricity, because of the danger like-
ly to arise from unprotected wire. If the
wires were run underground, he said, his ob-
jection would be withdrawn.



Union Manufacturing Co.,
Warehouse, 96 Chambers St., New York. NEW BRITAIN, CONN.

This Advertisement Changed Every Week.



Spools, weight about 100 lbs., and length
of wire about 1500 feet.

IOWA
BARB WIRE CO.

99 John St., New York.
89 Lake St., Chicago.
STAUFFER, MACREADY & CO.,
New Orleans, La.

**BARB WIRE,
DIGGERS,
STRETCHERS,
STAPLES,
Etc., Etc., Etc.**

JAMES W. ROSS,
IMPORTER OF AND FURNACE AGENT FOR
SCOTCH AND AMERICAN PIG IRON.

MANUFACTURERS' AGENT OF
Bar Iron, Car Wheels, Axles, Rails and Railroad Supplies.
SOLE AGENT

WHITAKER IRON COMPANY,
OF WHEELING, W. VA., MANUFACTURERS OF
SHEET IRON, TANK AND FIRE BED.
36 DEARBORN STREET, CHICAGO.

NATIONAL HARDWARE & MALLEABLE IRON WORKS,

Lehigh Avenue, American and Third Streets, Philadelphia.

THOMAS DEVLIN & CO.,

MALEABLE, FINE GRAY IRON AND STEEL CASTINGS made from patterns to
order. Special attention given to Tinning, Bronzing, Coppering, Japaning and Fitting. A large line of
Carriage and Wagon Castings constantly on hand for the trade.

BRIDGEWATER IRON CO., Bridgewater, Mass.

Manufacturers of

SEAMLESS DRAWN BRASS & COPPER TUBES,

BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,

TACK PLATES and Forgings of Every Description.

NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.

AUBURN FILE WORKS,
Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
FULLER BROS., Sole Agents,
80 Chambers and 71 Reade Streets, N. Y.

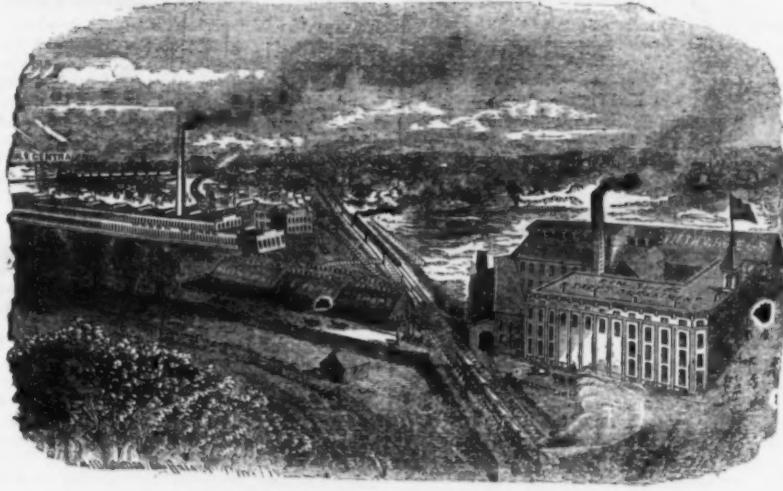
Paris, 1878.
McCAFFREY & BRO.,
PENNSYLVANIA FILE WORKS,
Philadelphia, Pa., U. S.
For Superiority.


Manufacture and keep in stock a full line of **FILES** and **RASPS** only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

GRAHAM & HAINES,
P. O. Box 1042.
113 Chambers and 95 Reade Streets, New York.
HARDWARE MANUFACTURERS' AGENTS, as follows:
Detroit Block Works, Tackle Blocks.
Howard Bros. & Co., Cotton Wool and Curry Cards.
Thompson, Derby & Co., Scythe Smiths.
Utage Fork Mills, Steel Forks, Rakes, Hoes, &c.
H. Knickerboker, Scythes, Axes and Tools.
H. & J. K. Knickerboker, Hammers.
Iron City Tool Works, Hoses, &c.
Jacobus & Nimick Mfg. Co., Locks, &c.
Sandusky Tool Co., Planes and Plane Irons.
Geo. H. Eddy & Co., Measuring Tapes.

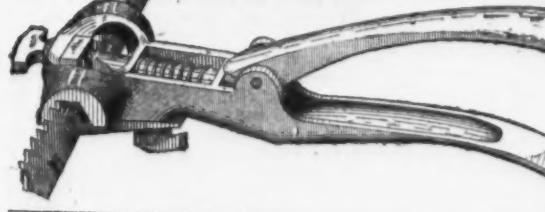
CARRIAGE HARDWARE.



Our new Illustrated Catalogue of 140 pages, and over 300 illustrations, will be mailed on application.

THE E. D. CLAPP MFG. CO., Auburn, N. Y.

Morrill's Perfect Saw Sets.



For price lists and discounts, address

ASA FARR,
64 College Place,
corner of
Chambers Street,
New York.

JOHN J. SPOWERS, President.
THE JERSEY CITY GALVANIZING CO.,
MANUFACTURERS OF
GALVANIZED MATERIAL OF EVERY DESCRIPTION.
GALVANIZING IN ALL ITS BRANCHES.

Galvanized Sheet Iron—Best Bloom, Best Refined, Common. Galvanized Round, Square Band and Hoop Iron, &c., &c.

All Sizes
of Corrugation
from
1/4 to 5 inches.

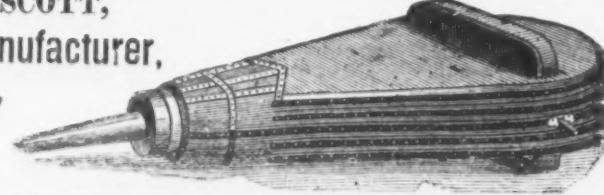
All Gauges
and
Sizes
of Sheets.

Corrugated Sheet Iron a Specialty. Galvanized, Black and Painted. Iron Corrugated for the Trade. Estimates furnished on application.

WORKS: GREEN AND BAY STREETS, JERSEY CITY, N. J. OFFICE AND WAREHOUSE: 98 JOHN STREET, NEW YORK.

GEO. M. SCOTT,
Bellows Manufacturer.

Johnson Street,
Cor. 22d St.,
CHICAGO, ILL.



TUFTING BUTTON

PATENTED June 28, 1881.

THE AMERICAN TACK CO., Fairhaven, Mass.,
are making TUFTING BUTTONS with every Eye Soldered to its Back, giving them great Strength and Durability. All Buttons are guaranteed satisfactory. Also Lining and Saddle Nails, and every variety of
TACKS and NAILS.

New York Salesroom, 116 Chambers Street.

Nicholson FILES.

Bandsaw Files, Boot Heel, Brass, Cabinet, Cant, Cotter Taper, Cotter Equaling, Cross or Crossing, Doctor, Drill, Feather Edge, Finishing, Flat, Flat Equaling, Flat Wood, Gang-Edger, Ginsaw, Gulleting, Half-Round, Half-Round Wood, Hand, Hand Equaling, Handsaw Blunt, Handsaw (Double-ender), Handsaw Taper, single cut, Handsaw Taper, double cut, Handsaw Taper, slim, High Back, Hook-Tooth, Knife, Knife Blunt, Lead Float, Lightning, Machine Mill, Mill, Mill Blunt, Mill Pointing, Pillar, Pitsaw, Reaper, Roller, Round, Round Blunt, Sloting, Slim Handsaw Taper, Square, Square Blunt, Square Equaling Files, Stave Saw, Three-Square Files, Three-Square Blunt Files, Tumbler Files, Union Cut, Warding Files, Warding Blunt File, Warding Round Edge File.

RASPS.

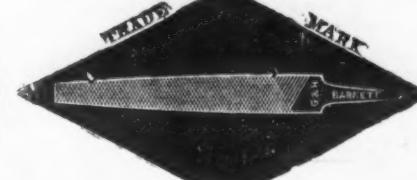
Baker's, Beveled Edge, Bread, Cabinet, File, Flat and Half Round, Flat Shoe, Flat Wood, Half-Round Shoe, Half-Round Wood, Horse, Plain and Tanged, Horse Mouth, Jig, Oval or French Shoe, Racer, Plain and Tanged.

SPECIALTIES.

Butchers' Steels, Improved, Bent Riflers, Handled, File Cards, File Brushes, Machinists' Scrapers, Stub Files & Holder, Detachable, Surface File Holder, Vise File Holder.

**NICHOLSON
FILE CO.,
PROVIDENCE,
R. I.,
SOLE MANUFACTURERS.**

Black Diamond File Works.



Awarded by Jurors of Centennial Exposition, 1876, for
"VERY SUPERIOR GOODS."

G. & H. BARNETT,
39, 41 & 43 Richmond St., Philadelphia.

CHARLES B. PAUL,
Manufacturer of HAND CUT FILES.

Warranted CAST STEEL.
All descriptions of Files made to order. Price List mailed on application.

187 Tenth Street, Williamsburg, New York.
Established 1863.

Manufacturers of

UNION FILE WORKS,

311 to 315 North St.,
BALTIMORE, MD.,

Manufacturers of

FILES AND RASPS

Made from the Best Refined Cast Steel.
With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

MORITZ & KEIDEL, Agents,
48 & 50 German St., Baltimore, Md.

INCORPORATED 1881.



GILBERT PARKER, Treas. and Gen. Agent.
THE J. BARTON SMITH CO.,
Manufacturers of the Celebrated

J. B. SMITH'S FILES, RASPS, WOOD SAWS, &c.,
211, 215 & 217 New Street, PHILADELPHIA.
New York Branch, 128 Chambers Street.
Prices the lowest. Goods the best.

WM. H. BRAMHALL, Manager.
Send for sample order.

DODGE & BLAKE.
DODGE'S PATENT

FILE FORGING AND FILE GRINDING.

These machines have long been in use in this country and in Europe, and are unexcelled for perfection of work and labor saving. We now offer them with the latest improvements, and will apply them to forging and grinding other articles of tapering or otherwise irregular form.

Works at Woodside, NEWARK, N. J.

THRIFT FILE WORKS,
Manufacturers of all kinds of
Files, Rasps.



JOHNSON & BRO.
No. 1 Commercial Street, Newark, N. J.
FILES!

FILES!

FILES

NORTHWESTERN FILE WORKS,

65, 67 and 69 So. Canal St., Chicago,

Make a specialty of 12 and 14-inch Flat. Will be pleased to hear from parties using the above sizes largely.

STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Rochester, Cleveland, Buffalo, Boston, St. Louis, Quincy, Chicago, Milwaukee and elsewhere, at

W. C. METZNER,

127 W. Randolph St., Chicago, Ill.

LANE'S MEASURING FAUCET.

Price, \$3.00.

For Light or Heavy Molasses, Oils, Varnishes or other Fluids.

We warrant these Faucets to be as represented, measuring correctly and working easily in heavy molasses than any Measuring Faucet in the market. No grocer can afford to be without them.

The "Lane" is named. They insure perfect cleanliness, requiring no tin measures or funnel to collect dirt and draw fluid. They do not drip.

They prevent all waste, as the molasses is taken full strength except when the valve is turned.

They are the embodiment of simplicity, and consequently they are always in order. They work easily in the heaviest molasses. They are guaranteed to measure correctly, according to U. S. Standard.

MANUFACTURED EXCLUSIVELY BY

LANE BROS., Millbrook, N. Y.

General Agency, GRAHAM & HAINES, 113 Chambers St., New York.

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Make a specialty of 12 and 14-inch Flat. Will be pleased to hear from parties using the above sizes largely.

STOVE REPAIRS.

Cutlery.
THE
LAMSON & GOODNOW MFG. CO.,
Salesroom and Warehouse,
38 Chambers Street, New York City.
Factories,
Shelburne Falls, Mass.
Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.

OUR
BUTCHERS' and HUNTERS' KNIVES
Are warranted to be equal in style, finish and quality, to any goods made in the world.
"COMPARE, THEN JUDGE."

We are the sole owners of the *Gardner Patent Guard and Rest for Carving Forks*, and the manufacture of fine carvers is with us a specialty.

AMERICAN MADE RAZORS
CUSHION BELT
OUR NEW PATENT
COMBINATION RAZOR STROP
J. R. TORREY,
MANUFACTURER OF
STROPS
In All Styles.
To introduce we offer **HOLLOW GROUND RAZORS** at \$1.75, \$2.50; Ivory, \$2.50. Our **SWEDISH GEM RAZORS**, \$1.75, \$2.50; Ivory, \$2.50. All our own make, and warranted the best cutters in the world. As Razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cents a Strop warranted to set a fine edge to any razor. If in morocco case, \$1. Catalogues to the trade.

JOHN WILSON'S CELEBRATED TRADE MARK.
FOUR PEPPERCORNS AND A DIAMOND.
GRANTED A.D. 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD AND PROTECTED BY ACT OF PARLIAMENT.
REGISTERED ALSO AT WASHINGTON U.S.A. ACCORDING TO ACT OF CONGRESS
ALSO AT LEIPZIG, IN ACCORDANCE WITH THE GERMAN TRADE MARKS' REGISTRATION ACT.
WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.

Seymour's Diamond Edge Solid Cast Steel SHEEP SHEARS.
Great Triumph of American Industry.

See issue of March 2 for full particulars.
Every Pair Warranted Superior to Imported. Price lists sent on application.
HENRY SEYMOUR CUTLERY CO., 84 & 86 Chambers Street, NEW YORK.

Manufactured of
IMPORTED ENGLISH CAST STEEL.
Every Pair Warranted.
For samples and prices address,
GIFFORD MANUFACTURING CO.,
OFFICE, 39 WORTH STREET, NEW YORK.
Factories, Union City, Ct.

STAR TOOL CO.
FLEXIBLE STEEL RULES and CENTER GAUGES Made of Best Quality Tempered Steel.
These Rules and Gauges are guaranteed of correct measurement, graduating $\frac{1}{16}$, 1-16, 1-32 and 1-64 in. Price Lists upon application.

McCoy & Sanders, Sole Agents,
43 Chambers St., New York.
Office of

PHOENIX CASTER CO.,

Indianapolis, Ind.
Hubbard, Spencer & Co., Chicago, have sold our Casters as follows:
1879. \$322.60
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We have just issued a new Catalogue, which we would be pleased to mail with terms upon application.

PHOENIX CASTER CO.,
Manufacturers,
INDIANAPOLIS, IND.

WROUGHT IRON ADJUSTABLE
"Forty Daisy Trucks in use. Just as what we want." WASHINGTON STAMPING CO., Washington, Ohio.
TUCKER & DORSEY, MANUFACTURERS, INDIANAPOLIS, IND.

SUSCEPTIBLE OF 32 CHANCES
A PERFECT DAY SAFE.
TUCKER & DORSEY, INDIANAPOLIS, IND. U.S. AMERICA.

Cutlery.
CORPORATE MARK
Joseph Rodgers & Sons' (LIMITED)
CELEBRATED CUTLERY,
No. 82 Chambers Street, New York.
F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons' productions having considerably increased, they have, in order to meet it, greatly extended their Manufacture Premises and Steam power.
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Alfred Field & Co.,
COMMISSION MERCHANTS,
New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery,
SPECIALTIES.

Headquarters for
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GOLMAN COIL AND HALTERS and other CHAINS,
BRADES, TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES,
Etc. Etc.
All sorts of Hardware and Merchandise for import and export purchased on commission.

Silver Medal, 1878—Paris.

JOHN SPENCER & SON,
Albion Steel Works, Sheffield,
MANUFACTURERS OF

FILES
AND
STEEL,
Table Knives, Razors, Shovels, &c., &c.,
of every description.

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Granted 1749.

FURNESS, BANNISTER & CO.,
NEWARK, N. J.
Manufacturers of

TABLE CUTLERY.
PRICES FURNISHED ON APPLICATION

HILDEBRAND
SELF-MEASURING
PUMP AND TANK

Economical, saves all the oil, reduces insurance. The best arrangement extant. Can be used in barrel as readily as in tank. No measure or funnel used.

THE YOUNGSTOWN
MEASURING PUMP CO.,
Sole Manufacturers,
YOUNGSTOWN, O.

Every Pump guaranteed to be just what we claim for it.

For further information address Company, as above.

GEORGE W. BRUCE,
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ATLANTIC SCREW
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And Agent for the
FLORENCE TACK CO. and
C. A. MAYNARD

Maward's G. S. Planters' Billing and Bog Hoses; Billing's Crown, Planters' and Billing's Tack and Wedding Planters' and Grub; a variety of other kinds for Home and Export Trade.

THE "EDDY" STRAIGHTWAY
VALVES.
ALSO,
FIRE HYDRANTS.
AXE, Hatchet, Powder and
Brush Machinery.

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Fires from Spontaneous Combustion

May be prevented by using

MACHINERY WIPER CLOTHS.

Instead of cotton waste for cleaning Machinery, &c. Don't wait until you have a fire before waking up to the importance of adopting our Wiper Cloths. For sale by the trade generally, or by the

BROWN MANUF'G CO., Providence, R. I.

These Towels are the best for all kinds of cleaning. Price to consumers, \$3 per 100. Special prices to the trade.

Write for Catalogues and Prices.

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Cutlery.
ROBERT SORBY & SONS,
SHEFFIELD,
MANUFACTURERS OF THE CELEBRATED
KANGAROO SHEEP SHEARS.

The best
Shears
made.
Every
Shears
Guaranteed.

ALFRED FIELD & CO.,
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SOLE AGENTS.
Send for price list and terms.

ESTABLISHED 1853.

E. E. EATON,
GUNS,
AMMUNITION,
FISHING TACKLE,
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MANN'S
Trolling Spoons

PERFECT
MANN'S
N° 21
REVOLVING

Sixty varieties manufactured, suitable for Trolling for all kinds of fish that will take an artificial bait, and adapted for any lake or river in the United States.

Our Perfect Revolving Spoons undoubtedly the best general Spoon for taking fish ever offered to the public.

Three sizes made—No. 20 for bass, pike, pickerel, or fish under five pounds weight; No. 22 for large fish, and the best spoon ever made for salmon trout; No. 22 excellent for deep water fishing.

Beware of imitations. None genuine except JOHN H. MANN'S name stamped on every spoon.

Sold wholesale and retail by the principal dealers in Fishing Tackle.

JOHN H. MANN & CO.,
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FRED'K MALLESON,
MANUFACTURER OF

Fishing Reels,
Split Bamboo Rods,
FINE WOOD RODS, HOOKS
ON GUT, LANDING RINGS
And FRAMES, &c.

136, 138, 145, 142 & 144 FIRST STREET,
BROOKLYN, F. D. N. Y.

KEYSTONE RIVETING FORGE.

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LAMBERTSON'S
PRICE BOOKS.

Full Leather, \$7.50. Half Leather, \$6.50.

Pocket Edition, Full Leather, \$3.50.

Bolt List, \$1.00.

Screw List, 50 cents.

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For sale at publisher's prices by Wm. Blair & Co., Chicago; A. F. Shapleigh and Canfield Hardware Co., St. Louis; C. B. James, Detroit.

GEO. H. CREED,
SHIP CHANDLERY,
103 Reade Street, New York.

Manufacturers of and Wholesale Dealers in

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Cotton and Linen Ropes,

Creed's Patent Sails, Clews, Holtman's Wire Rope

Splices, Agent for Raymond's American Crane Oil

for lubricating Cylinders and Valves.

CHAS. E. LITTLE,
59 Fulton St., N. Y.
928 Fulton St., Brooklyn, N. Y.

Solid Cast-Steel Pump Augers
For Boring Pump Legs and Pump
Tubing, with all necessary fittings. Agents for
Hornbeam's Wood-Working Machinery
and Lathes.

ACCESSES
PAT. DEC. 26, 1871.
Established in 1839.

A. G. COES & CO.
WORCESTER,
MASS.,

Successors to
L. & A. G. Coes,
Manufacturers of

THE GENUINE
COES
Screw

Wrenches.

PATENTED,
May 9, 1871.
December 9, 1871.
December 28, 1875.
August 1, 1876.

The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

STANDARD
GIRARD WRENCH.
WARRANTED.

FOR
STRENGTH
AND
Durability
IT HAS
NO SUPERIOR.

GUARANTEED
IN
EVERY RESPECT.

Wrought Bar, Head
and Screw.

Owing to the increased demand for these justly popular wrenches, we are now manufacturing more than any other establishment in the world.

Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.

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TERMS AND PRICES

OUR
TRADE
MARK.

FOR
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AND
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IT HAS
NO SUPERIOR.

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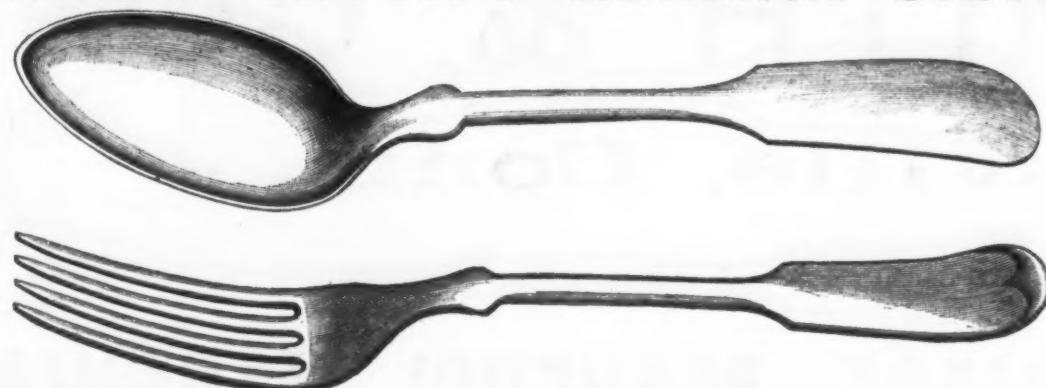
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MARK.

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STRENGTH
AND
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IT HAS
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GUARANTEED
IN

HALL & ELTON'S GERMAN SILVER.



1887.

1882.

In addition to Spoons of this well-known brand, we are now prepared to furnish Forks of the same quality. We GUARANTEE these goods to be SOLID and of UNIFORM quality throughout, with no coatings to wear through or flake off, and with no liability to RUST.

HALL, ELTON & CO., Wallingford, Conn., and 75 Chambers St., New York.

HOLMES, BOOTH & HAYDENS,

MANUFACTURERS OF

Finest Quality Silver-Plated Spoons, Forks, Knives, &c.

" JAPANESE
PATENTED." JAPANESE
PATENTED.

NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 12 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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NEW YORK.

Factories,
WATERBURY, CONN.

18 FEDERAL ST.,
BOSTON.

T. G. CONWAY, 88 Chambers Street, New York,

Manufacturers' Agent for

REVOLVERS, BREECH-LOADING GUNS, TABLE CUTLERY,
CAST IRON, NICKEL PLATED & STEEL SHEARS.Representing THE LEE ARMS CO.,
C. S. SHATTUCK.THE GREENFIELD CO-OP. WORKS,
ATLAS WORKS.J. K. RUPERTUS.
THE MILLVILLE SHEAR CO.

POWER PRESSES,
RIVET MACHINES,
Special Machinery to Order.

IRON and BRASS RIVETS,
STUDS, PINS, &c.,
For Manufacturers of Light Hardware.

BLAKE & JOHNSON,
WATERBURY, CONN.

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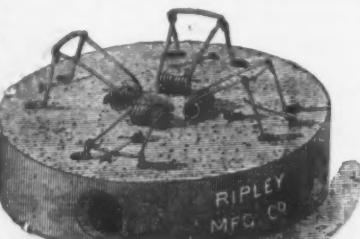
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AND
Metallurgical Review.

New York, Thursday, March 23, 1882.

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A correspondent in Pennsylvania calls our attention to the fact that the text-books of political economy used in the schools and colleges nearly all inculcate the principle of free trade, and asks whether this cannot be counteracted by the introduction of an American book on the science of government, which shall explain the true principle of a protective tariff. "Such books," says our correspondent, "should be in the schools and colleges of the United States, and should treat of the powers, the objects and duty of the government, and the duty of citizens." The suggestion of our correspondent is not a new one, and the question has been asked many times, how the evils resulting from the teaching of free-trade principles in our schools and colleges can be counteracted. The production of a book adapted for use as a text-book would not do this, for at present it would be impossible to secure its introduction.

The remedy for the present unsatisfactory condition lies with the business men and citizens who are the patrons and trustees of our educational institutions, and until they are disposed to take an active interest in the matter, it is not at all probable that professors and presidents can be induced to change the present system, for they were brought up on the English text-books of political economy, and have no sympathy with the American idea. Being without experience in practical affairs of life, they do not understand the benefits of protection, and are too much prejudiced by early education to learn from statistics of our industrial development what, to the unbiased mind, they clearly show. It is to be regretted that our greatest political economist, Henry C. Cary, did not have a happier literary talent. No one was so well prepared as he to make a great and standard text-book of political economy for use in our colleges, but he seems to have lacked the talent which was needed to give his books popular interest.

Strikes of Labor Against Labor.

The Pittsburgh Times, in a recent editorial regarding the strike at the Pittsburgh Bessemer Steel Works, enforces the importance of a phase of this and many other strikes that is too frequently, indeed almost universally, lost sight of. This strike is regarded and commented upon as a quarrel between the owners of the mill and the labor employed in the same. The truth is that it is a contest between workmen themselves. To quote the Times editorial:

It is not capital arrayed against labor; it is labor contending against labor. The Bessemer Company offered certain wages for the services of such men as were needed to carry on its operations. One party, known as non-unionists, agreed to the terms; the other, belonging to the Amalgamated Association, would not accede to them, and "struck." Because the former continued at work, the latter, left idle, grew angry, but their wrath manifested itself, not against the mill owners, but the non-striking operators. No man was lifted against any owner or officer of the mill at any time. Only the men not of the union, who did not care to lose their labor and its wages and so continued on at their tasks, were made the victims of the violent revenges that followed. This same state of affairs exists still. The associated laborers ask to be restored. As a condition to this restoration they demand that men at work "who do not belong to their association" shall be dismissed to make place for those who do belong to the association—the issue all the while, be it noted, being one as between society labor and independent labor. Capital, except as a sort of arbiter, having nothing to do with the matter whatever. It is well that this fact should be kept carefully in mind. Only in this way can the situation be fully and fairly understood. The attempt when made, and by whomsoever made, to shift it and throw the responsibility on other shoulders is gravely, outrageously wrong.

The case of the Times is still stronger when it is known that the question at issue was not one of wages really, but rather one involving the facility of striking. The company did at first demand that its employees should belong to no union, but it soon abandoned this position, and the strike was really over the question of giving three days' notice before leaving. The non-union men agreed to this and in the end the union men did also, and the issue at last was squarely one of union labor vs. non-union labor, in which the union labor demands that the manufacturer shall be its constable and enforce its edicts against those that do not choose to join the union ranks and be guided by the dicta of the Amalgamated. Strikes of labor against labor are much more frequent than are generally supposed. When a strike is announced the popular belief always is that it is one of labor against capital. Very frequently in the iron business the manufacturer has no part in it. It is about matters over which the manufacturer has no control. It is labor against labor. The recent long-continued strike of the cold feeders, at Wheeling, was not against the manufacturers, but against their fellow-workmen, the nailers. In nail mills, the nailing is paid so much per keg for cutting nails. Out of this he pays the feeder a certain proportion. The strike was for an increased proportion of what the nailers got per keg. The mills could not help themselves. They could not force the nailers to give a larger proportion, and so a large part of the mills were idle. Similar strikes take place about the rolls, the under hands striking against the rollers for a larger proportion of the wages paid per ton. It often happens that these "strikes" of labor against labor are the longest continued and most bitter of any that occur. It is the old story, that the hardest taskmasters of labor are those who have been laborers themselves.

In view of all these facts, we would suggest that it would be well to ask, when a strike is in progress and before the usual epithets of tyrannical, &c., are lavishly applied, whom the strike is against and whether the one that is entitled to sympathy is not the one against whom the strike is undertaken. It may be, it often is, true that the striker is the tyrant.

The spring meeting of the American Society of Mechanical Engineers will be held in Philadelphia, beginning Wednesday, April 10th. The details are not yet fully arranged, but we have no doubt the meeting will be both pleasant and profitable, and that the resident members of Philadelphia will do all in their power to give the visiting members a good reception. For mechanical engineers Philadelphia is a very interesting city, and the difficulty will not be to find interesting places to visit, but to choose between the many attractions, and to employ to best advantage the limited time which can be given to the examination of process and plant.

Canals vs. Railroads.

The report of the Canal Auditor of New York presents some remarkable features regarding the movement of freights through the State by rail and canal, as will be evident on an inspection of the following statement showing the business of the canals and the New York Central and Erie Railways, and the aggregate movement for each year, commencing with 1876:

Year.	Tons moved by Canals.	Tons moved by N. Y. C. R. R.	Tons moved by Erie R. R.	Aggregate tons moved.
1876	4,172,139	6,803,680	5,972,818	16,948,637
1877	4,955,963	6,351,366	6,182,451	17,489,770
1878	5,171,382	7,094,413	6,150,504	19,073,701
1879	5,024,372	9,075,753	8,232,044	23,997,766
1880	6,457,659	10,533,038	8,775,803	25,766,500
1881	5,179,192	11,591,370	11,086,821	27,857,364

The aggregate tonnage of the two railroads amounted to 22,678,203 tons, being a gain over the previous year of 3,429,212 tons, or over 17 per cent. The combined tonnage of the canals and the railroads was the highest aggregate yet reached, being a net gain of 2,150,808 tons over the previous year, and a gain of nearly 65 per cent. over the tonnage of 1876, when the aggregate was 16,948,627 tons.

The business of the canals, however, shows a loss in tons of \$523,029, or over 45 per cent., and a loss in tonnage of 1,278,464 tons, or nearly 20 per cent. It will also be noted that the business of the Erie road increased nearly 2,250,000 tons, bringing it up almost equal to the Central, while the Central increased but about 1,000,000 tons.

Admitting the commercial importance of our water-ways, it looks as though railroads were superseding the New York canals, and as though at no distant date these must follow the course of the old Pennsylvania Canal and the James River and Kanawha, and cease to exist as a transportation route for through freight. Railroads can and do carry almost as cheap as canals—as cheap, if time, delay, insurance, &c., are considered.

One of the most marvelous changes in the past decade has been the cheapening of transportation over railroads. The report of the Pennsylvania Railroad just issued shows that the average rate received for transporting a ton of freight a mile was less than 2¢, while the cost was less than 1¢. It is argued that the cause of this reduction is the existence of the Erie Canal, which is a conservator and forces low rates; but these low rates exist over the Baltimore and Ohio and Pennsylvania Railroads, the same as over the New York Central and the Erie, and there has been as great a reduction on the roads west of Chicago as on those east. The canal may have hastened the reduction, but it is not its cause. The causes are cheap steel rails and an immense amount of heavy traffic, improved motive power and the increase in the loading of cars made possible by steel rails, better track-bed and heavier motive power.

Contract Labor in the State Prisons.

There is just now a very vigorous movement among the workingmen to create a popular sentiment in favor of the abolition of the contract system in our State prisons. It is useless to argue the question whether the labor of citizens is diminished in value by the system of leasing the labor of convicts by contract, for the working classes have made up their minds that they are hurt by these contracts, and neither arguments nor facts would induce them to change their opinion. But there is one view of the case which they will do well to consider before they go any further. Either the convicts must be made to earn their own living by work, or they must be supported in idleness.

It is simply impossible to induce the people of this State to accept the latter alternative. Experience having shown that our State prisons can be made self-sustaining, the farming classes and tax-payers generally will never again consent to be burdened with the cost of maintaining them. Now, if convicts are required to work it must be by one of two systems. They must either work for the State or for private individuals who will pay the State for their labor. Under the contract system the products of their labor compete as little with the products of citizen labor as possible. It is the interest of the contractor to get as much for his goods as he can, and to make as large a profit as possible, and, so far as we know, the prices charged for prison-made articles are not lower than those demanded for articles of the same class made outside of prisons. In fact, the contractor cannot afford to sell them for any less, as his apparent advantage in the matter of cheap labor is more than offset by the disadvantage of having to take such men as are assigned to him, and to keep them at work 313 days in the year, whether he can sell his product or not. If the convicts were all skilled mechanics, his advantage would, undoubtedly, be very great; but few of them have either mechanical skill or the habit of industry, and to make their labor profitable, even at 50 or 60 cents per day, requires excellent management. Now, it would be easy, comparatively, to secure the abolition of the contract system and to make our prisons great State manufactures, but the advantage of such a change is very much more apparent than real. In that case the State would become a competitor with private enterprise, with practically unlimited capital and with no

fear of bankruptcy before the eyes of the prison officials. The goods thus made must be sold, and rather than keep them on hand they would be sold at whatever prices could be obtained. Such competition, we venture to say, would be infinitely worse than any ever experienced under the contract system.

The Situation at Homestead.

The strike at Homestead has again been adjusted, and the mill resumed work on Monday morning, this time, it is to be hoped, without a misunderstanding that will again lay it idle. This strike in some of its features has been so important and may have such far-reaching effects, that it may not be out of place to review its cause, progress and results briefly.

Up to the first of the present year the mill of the Pittsburgh Bessemer Steel Company, Limited, had been run as a non-union mill under a contract. During the latter part of last year some of the employees joined the Amalgamated Association of Iron and Steel Workers and organized a lodge, and when the time came to renew the contract for the present year, refused to sign the same. Those refusing were by no means a majority of the workmen. Indeed, they were quite a minority. The chief features of the contract as first offered for signature were three days' notice of an intention to leave, not more than three to give notice at one time. Some two weeks after the strike, began a clause demanding non-membership in the union was inserted, at the desire of the non-strikers, as a measure of protection to themselves, but was afterward withdrawn at their request. There was also a question of wages involved, the company claiming that they paid more than other mills and demanding the same rates.

Up to the settlement of March 11 the struggle on the part of the union men was really for a formal recognition of their power as arbiters of wages, for the difference in the amount of wages involved was not a serious one, as the settlement finally made shows. Having signally failed by the use of the ordinary means to force compliance with their demands, a general meeting of the Amalgamated Association for the Pittsburgh district was called, at which the unusual, absurd action was taken of ordering a strike in all the mills in which the stockholders of the Bessemer Co. were interested. This proved a bad move. The lodge connected with Singer, Nimick & Co.'s works refused to strike, ostensibly on the ground that legal notice had not been given; really, it was known, because they would not be a party to any such action. In the meantime the officers of the company and the union got together and reached the agreement of March 11, which was as follows: "The question of reduction of wages is withdrawn by the Pittsburgh Bessemer Company, subject to an adjustment between the company and the union men within thirty days, the Bessemer Company to retain the men now in their employ, or, in other words, this question is to be left to the discretion of the company. In place of signing the agreement individually, it may be signed by a committee of the lodge or lodges of the union belonging to the Amalgamated Association, or by President Jarrett, of that organization. This relates to what is known as the three days' notice agreement." In other words, the union signed the agreement of union men, the non-union men for themselves, the rate of wages to be arranged by conference, the non-union men to be retained.

The mill, however, did not get to work, and if the disturbances in the labor market continue we may expect a dull summer, whereas a very little decline in wages would lead to the placing of contracts enough to keep every man in the building trades busy until the end of 1882. The following interesting comparison of the average earnings per week of mechanics engaged in the various departments of building is given in the Real Estate Record:

January	January	January	January
1860.	1862.	1864.	1865.
Bricklayers. \$27 @ 32	\$15 @ 18	\$18 @ 20	\$24 @ 22
Carpenters. 27 @ 30	22 @ 18	15 @ 18	18 @ 21
Gas & steam fitters.	21 @ 21	18 @ 20	24 @ 21
Hod carriers. 24 @ 30	15 @ 18</td		

transportation solve itself by natural processes, and by the result of competition between the various companies. Legislation designed to bind the railroads to arbitrary tariffs for transportation of freight and passengers would probably defeat the end sought. It would be absurd to suppose that any nine men, however selected, could safely be invested with arbitrary power to determine what the 1200 railroads of the United States should charge per ton per mile. Statistics show a steady and rapid decline in the cost of moving freights over our railroads, and the obstacle to the prosperity of the country which is claimed to exist in the great distances to be traversed by rail cannot be very serious, when wheat grown in the far West can be moved to the seaboard and exported profitably in competition with British and Continental wheat. We are by no means sure that Congress cannot profitably legislate on the question of inter-State commerce, but it should approach this question with great caution, and with a due regard for the vast pecuniary and commercial interests involved. The House committee which has the Regan bill in charge might, with advantage, continue the inquiry all summer, for it will certainly be unable to report intelligently before the close of the present session.

The Post Office Appropriation Bill passed the United States Senate on Friday, minus the proposed amendment providing for ocean mail service by means of American-built steamers. Senator Davis, in the chair, decided that the amendment referred to was general legislation, not germane to the Post Office Appropriation Bill.

Referring to impending changes in the Canadian tariff, the Montreal *Herald* says the iron merchants complain loudly that they have not been as fairly treated as those in other lines of trade, who received ample notice and were enabled to keep their goods in hand.

WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., March 22, 1882.

The importers, having had things pretty much their own way in the matter of hoop iron and steel blooms, are now about to make a new departure in another article of iron manufacture. This time it is in axle forgings. The Secretary of the Treasury has already received preliminary information indicating that a request for a hearing will be made at an early day. The question at issue will be as to whether rolled or hammered iron, fashioned into the shape of forged axles, are axles. No date has yet been fixed for the hearing.

The orders consummating the change of duties on steel blooms of certain kinds have been sent to the Collector at New York, as follows: "On the 18th ult. you were directed to reclassify, at a duty of 45 per cent. ad valorem, certain steel railway blooms, imported by James Lee & Co., per State of Georgia, September 23, 1881, and Godeffroy & Co., per Pollux, October 25, 1881, and Amsterdam, October 13, 1881. The merchandise had been assessed by you with a duty of 2½ cents per pound, under the provision in Schedule E, for steel in ingots, bars, &c."

That this ruling is regarded a permanent one is shown by the following further instructions: "You will govern your action in accordance with the views thus expressed, and in any pending appeals of like character now before you, the entries will be readjusted at the proper rate of duty, and the necessary steps taken for a refund of the excess of duties exacted."

In another case—that of steel angle bars—the specific duty is maintained. In reply to a recent communication from the Collector at Detroit, the Secretary of the Treasury states the following reasons: "The department is in receipt of your letter of the 30th of December last, transmitting the appeal (\$5199) of the Detroit Dry Dock Company from your decision assessing duty at the rate of 2½ cents per pound on certain 'steel angle bars,' imported into your port, under transportation bond from New York, on the 21st of December, 1881, which the appellant claims to be dutiable at the rate of 30 per cent. ad valorem. It is understood that the merchandise in question consists of flat bars of steel bent at an angle, thus, L, and costing under 7 cents per pound. In the opinion of the department, the fact that the bars are bent does not have the effect of removing the merchandise from the category of steel in bars, as specified in Schedule E (Heyl, 1038). Your decision is therefore affirmed."

Petitions representing different parts of the country continue to be received urging the passage of the McKinley bill fixing the duties on iron and steel. Among the more recent may be mentioned that of the New Castle Iron Company, of New Castle, Del., of the workingmen and manufacturers and citizens of Hamburg, Pottsville, Norristown, Minersville, Dillingham and Thorndale in Pennsylvania, eight petitions of citizens of West Virginia, the petition of Thomas J. Edwards and other workmen in various counties in Bibb County, Alabama, and the petition of citizens of the Fifth Congressional District in the State of Missouri.

The Tariff Commission scheme has received a boom in the revival of a recent petition of the American Chamber of Commerce, of New York. This organization is said to be composed of 700 representative manufacturers, agriculturists, mine owners, bankers, lawyers, merchants, importers, exporters and other citizens resident in all the States and Territories of the Union. They regard special legislation in relation to separate classes of imported goods as prejudicial to commerce, alarming to capital and detrimental to the growth of our manufacturing interests, and for that reason ask the designation of a commission to inquire into and report upon the present tariff laws and the alterations and amendments necessary to be

made for the promotion of national prosperity, and, further, that no special legislation changing the present tariff laws be adopted until after the report of the commission. This scheme of handling the tariff question, however, is about where it stood a week ago. In the House it has been subjected to divers delays, the Anti-Mormon and Chinese bills having been disposed of meanwhile. In the Senate on Wednesday, March 15, it was informally set aside, being the unfinished business, Senator Garfield having previously given notice that when the bill comes up again regularly for the consideration of the Senate he should offer as an amendment the bill that was reported by the committee adversely, which bill he had himself introduced; the next day the bill was again laid aside informally in order to proceed with the Post Office Appropriation Bill. So it has been continued from day to day. No one has indicated a desire to speak on the measure, and another week is likely to drag along without any decisive action. It is evidently the intention of the Senate to await the action of the House in the premises. The unfortunate turn which matters have taken give this measure anything but an encouraging outlook.

In the parlance of the lobby, the tariff movement during the past week has received a decided setback. A free-trade Republican, who, under false pretenses, occupies a place in the Ways and Means Committee, finding his sinister aims not faring well, resolved on a flank movement, and under guise of considering the new rules, secured assent to call for a Republican caucus. In the committee it had been practically decided to report a bill making material reductions in the internal taxes, especially in repealing the nuisance of the check and proprietary stamps. It also provided for a reduction of the whisky tax to 50 cents a gallon; malt liquors to 60 cents a barrel; tobacco from 15 to 10 cents; cigars from \$6 to \$4 a thousand. It was estimated that this would make a reduction of from \$50,000,000 to \$60,000,000 during the next fiscal year. Though the revenues are regarded as exceeding the absolute necessities of the Government by fully \$100,000,000, the sub-committee had concluded that the above amount would be within safe limits, as too sudden and great a reduction might be attended by unfavorable effects upon the financial system. The sub-committee were ready to make a formal report to the general committee, and there was no doubt of the bill being submitted to the House for its favorable consideration and early action. When Chairman Robeson called the caucus of Republicans to consider the new rules, everyone supposed that this knotty question was to receive further discussion. It has since turned out that Mr. Dunnell, of Minnesota, who has been masquerading as a protectionist, and two or three others who have been playing the same role, were at the bottom of the whole movement, and had persuaded the chairman that the ostensible purpose of the bill was necessary to the interests of the party. Mr. Dunnell, it will be remembered, was one of the baker's dozen of Republican candidates for Speaker, and announced himself as such on the ground of his earnest advocacy of protection to American manufacturers and labor. It will be further remembered that he received the stupendous support of four votes.

When the caucus met, Representative Shollesberger, of the Beaver Valley District, one of the most important iron manufacturing centers in Pennsylvania, and who is an earnest and sincere advocate of protection, introduced a resolution to the effect that any reduction in the internal taxes of the country would be inexpedient at this time. Representative Bayne, of the Allegheny City District, greatly to the surprise of the protectionists, earnestly supported the resolution. Several others followed in the same strain, when Representative Dunnell took the floor and exposed the whole scheme. He stated that he favored no reduction in the internal taxes, as such a step would be more likely to secure a reduction in the customs duties, and that he favored this because it was his duty to his constituents. He furthermore stated that, during his last campaign, he announced himself as a free-trader, and that he would use all his influence to further that interest, and that if he had not taken this course he would undoubtedly have been defeated. This statement, it may be imagined, caused some excitement, for until then Dunnell had been recognized as a protectionist on his own showing. The proposition received a majority of the caucus, many Republicans unthinkingly voting for it. This action of the caucus was not only a direct blow at the Committee on Ways and Means, but made it appear ridiculous. Judge Kelley, its chairman, said that, while he favored a reduction in the excise, he believed in obeying the action of the caucus, and, unless its orders were reversed, he would abandon the bill pending in committee. He said that the Republican party was committed to a reduction of taxes in some way, and if it did not come off excise it would off something else. Russell Errett, who represents the Pittsburgh District, is highly incensed at this action of the caucus, as giving away a most favorable opportunity of protecting the people of taxation, and of protecting the manufacturing interests and workingmen of the country. Representatives McKinley and Townsend, of Ohio, support this view of the matter, and a few Democrats like Hewitt are also indignant. To complicate matters, the whiskey, malt liquor and tobacco interests threaten to combine against the tariff men, and antagonize any measure to fix the duties on iron and steel. Judge Kelley, however, perceiving the tendency of opinions in the House, says that he will favor a slow movement in matters relating to internal taxes and customs until public sentiment is expressed. Many influential members of the House say that the action of the few Republicans in misleading the party on this important question, will have the effect of defeating legislation on any tariff matters, and will, in all probability, embarrass the Commission project on the final issue.

In the Senate the Tariff Commission Bill has had quite a boom during the past week. Senator Pendleton made an elaborate speech in favor of the committee of Congress immediately preparing a tariff bill. He took the ground that the real difficulty in the

tariff was the number of details to be adjusted. The articles imported are so numerous, their classification so difficult and their uses so varied, that the proper relation of duty on raw material and on the manufactured article, the gradations of amount when duties are levied on an ad valorem or specific basis, and the point where revenue fails and exclusion begins, make up the real difficulty of the tariff. He was, therefore, opposed to a commission, adding: "If I had the power I would vote to instruct the Committee on Ways and Means of the House to report a bill. I am sure we have members of the Committee on Finance in the Senate who could perfect it as well as any experts in the country whom we are likely to get." Senator Morrill then spoke at length in favor of the commission, assuming that the President would appoint fit persons, and if not, they would be rejected by the Senate. Senator Beck, from Kentucky, next took a turn in a characteristic speech. He made the statement that a workingman in Windsor, opposite Detroit, could live at one-half the expense of the same man in Detroit. This led to a cross-fire which considerably enlightened the Kentuckian Senator. Sherman wanted to know why, if what Beck said was true, Windsor was such an insignificant town. This, the Senator again dodged by insisting upon coming back to the facts. The Ohio Senator then gave the Kentuckian another plumper by inquiring, if living was so cheap in Windsor, why all the people of Detroit did not go over there to live. To this Beck was forced to reply: "Why, sir, the tariff cannot destroy this country," the contrary of which he had just been endeavoring to prove. At this juncture Senator Garland, who sits near by the Senator from Kentucky, came to his relief by asking permission to move to adjourn, to which Mr. Beck assented. Before the question was put, Frye, of Maine, desired to know how it was that a few years ago 300 French Canadians settled in his town, accumulated property in five or six years, and then returned to Canada. Mr. Beck made no reply to this, and the Senate adjourned. Having rallied from his discomfiture on Saturday last, the Senator from Kentucky again entered the lists on Monday, and saluted forth into a wandering argument, which elicited from several Senators an interrogatory as to which side he was on, to which he replied: "To a system that most closely confines the tariff to revenue."

In the House the Tariff Commission Bill met with a decided success, on a resolution of Judge Kelley, chairman of the Committee on Ways and Means, to make the bill to provide for a commission to investigate, the special order when the House next resolved itself into Committee of the Whole on the state of the Union, and so continue as the special order until disposed of. Springer, Cox, Blackburn and other free-traders, endeavored by supercilious objections to throw obstacles in the way. Chairman Kelley assented to a modification of the resolution, adding to it "not to antagonize the general appropriation bills." The resolution was adopted by a vote of yeas, 154, nays, 56, under suspension of the rules. The Tariff Commission Bill may be said to be fairly launched.

Consult-General Stanton, of St. Petersburg, has forwarded to the Department of State an interesting resume of the mining and metallurgical industries of Russia in 1879, (the latest report), taken from the report of Mr. Shalkofoski, sub-director of the Department of Mines. This shows that while Russia's mining industries are constantly increasing, they are still far from meeting the home demand. The following table shows the production in pounds, (one pound being equal to 36½ pounds avoirdupois):

RUSSIA'S PRODUCTION OF METALS AND MINERALS.

Articles.	1878.	1879.
Gold, pounds.	3,572	2,631
Platinum, pounds.	126	138
Silver, pounds.	609	637
Lead, pounds.	85,881	82,842
Copper, pounds.	214,846	19,000
Zinc, pounds.	88,998	22,388
Iron ore, pounds.	25,478,549	26,123,626
Iron, pounds.	16,668,717	17,100,342
Steel, pounds.	5,801,754	12,929,170
Coal, pounds.	154,014,309	173,238,024
Naphtha, pounds.	15,324,167	21,475,969
Can iron, pounds.	3,247,663	3,161,421
Chromite, pounds.	935,397	643,115
Cooking salt, pounds.	47,748,328	49,920,889
Gold, silver, &c., pounds.	45,740,653	43,040,625
Laborers in mines, for millia, &c., number.	312,939	292,046
Laborers killed and injured.	425	612

In iron ore, steel and coal there has been a large increase. Steel has made special progress in St. Petersburg, Poland and the Ural districts, owing to the Government's demand for steel rails and the allotment of premiums, yet the production of iron and steel barely suffices for one-half the demand. The production of coal in Poland has quadrupled in ten years. Coal, pig iron, iron, steel, copper are the most important products of the mining and metallurgical industries which are imported across the European frontier, and the following table shows the amount and origin of these imports:

From	Great Britain.	Prussia.	France.	Germany.	Russia.	Poona.	Coal.	Pig Iron.	Iron.	Steel and Steel Rails.	Copper.
United Kingdom.	7,558,047	8,656,738	1,028,172	1,250,124	1,400,033	1,252,124	16,000	16,000	16,000	16,000	16,000
Denmark.	1,700,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760	1,888,760
Norway and Sweden.	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717	1,717
Italy.	114,513	114,513	114,513	114,513	114,513	114,513	114,513	114,513	114,513	114,513	114,513
United States.	2,330	2,330	2,330	2,330	2,330	2,330	2,330	2,330	2,330	2,330	2,330
	6,955	6,955	6,955	6,955	6,955	6,955	6,955	6,955	6,955	6,955	6,955
	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413	1,413

A table is also given by the sub-director

showing that Russia produces the following percentage of her consumption: Iron, 65 per cent.; steel, 77; copper, 22; zinc, 51; and coal, 67. The report also contains much other interesting data referring to other mining and metallurgical industries.

The Secretary of the Treasury, in reply to the application of Mr. Leng, has appointed a later hour for the discussion of the question of spayed hoop iron. This hoop iron problem having taken every possible shape, now comes up in a new form, the question being, this time, whether hoop iron cut to lengths and spayed should be considered as hoop iron or as a manufacture. In regard to the question whether iron forgings in the shape of axles are simply forged iron or a manufacture, the Department has heard nothing further from the parties and no action has therefore been taken.

It appears, from information received at the Treasury Department, that the labor strikes throughout the country are on the increase, and that the number of men out of employment is exceptionally large. This is said to be the case particularly in the cotton manufacturing districts of New England. Wages are, in some instances, reported lower than ever known. There is no evidence, however, that existing strikes are the result of co-operative action among the working classes of different sections, as in 1877, and they may therefore be considered as purely local.

The Committee of Ways and Means have directed the Sub-Committee on Internal Revenue to prepare a bill abolishing all internal revenue taxes, except on whisky, malt and tobacco, and the tax on bank circulation, and proprietary stamps on all medicines containing over 20 per cent. of alcohol. It is estimated that this will make a reduction of about \$17,000,000, and should special taxes and licenses be abolished, the amount will probably be increased to \$20,000,000. The vote in the Committee was six to five, two being absent, and the Democrats all voting against the proposal directing the Sub-Committee to prepare a bill as above indicated.

SCIENTIFIC AND TECHNICAL.

The carbonaceous residue from the solution of steel in the double chloride of

COPPER AND AMMONIUM.

When steel is treated with the double chloride of copper and ammonium, it dissolves and leaves a carbonaceous residue. Mr. Andrew Blair, in a series of experiments, washed this residue with the above double chloride acidulated with hydrochloric acid, and finally with water, until the filtrate gave no precipitate. Then nitrate of silver was added. A careful examination of the substance then revealed the fact that it contained carbon, hydrogen, oxygen and chlorine, besides a small quantity of nitrogen. It appears probable that the carbonaceous substance is not simply a hydrate of carbon, but rather a carbon compound.

Magnetic properties of

IRON FROM SANTA CATARINA, BRAZIL.

Specimens of native iron found in the province of Santa Catharina, Brazil, were found in their natural condition to be feebly attracted by the magnet, but if heated to redness and subsequently cooled a magnetic property is manifested with the usual intensity of iron. Since the iron in question contains about 34 per cent. of nickel, a series of experiments were undertaken with the view of determining whether pure iron and pure nickel crystallized in the cold did not exhibit the same effect as the Brazilian iron. It was found that while the iron in question contained about 34 per cent. of nickel, after heating, showed a considerable increase of its magnetic property. It was concluded from these researches that the nickel-bearing iron of Santa Catharina has been crystallized at low temperatures.

Alexander Watson, of San Francisco, has recently patented a new

APPLIANCE FOR EXPLODING BLASTS,

the method of firing the explosives being specially adapted for that class known as high explosives, such as nitro-glycer



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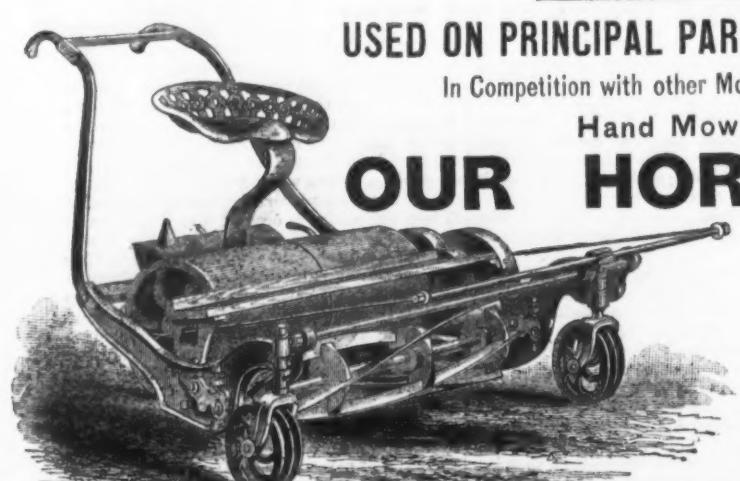
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WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

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HARVEY W. PEACE COMPANY, LIMITED, VULCAN SAW WORKS,
BROOKLYN, E. D., N. Y., Manufacturer of First Quality

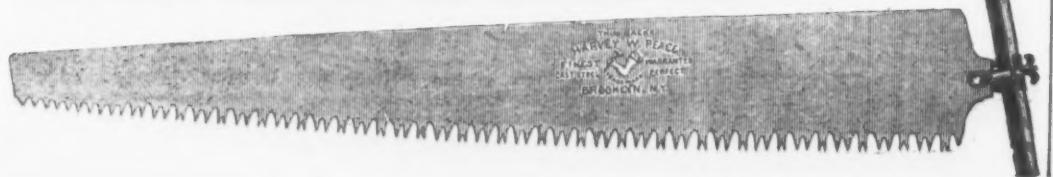
Hand, Panel, and Rip Saws,

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Also, MILL, CROSS-CUT AND CIRCULAR SAWs.

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A SPECIALTY.



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MANUFACTURERS OF



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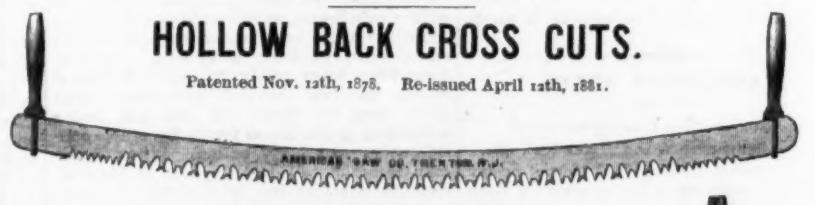
**PIG TIN, PIG LEAD, PIG COPPER,
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With Reversible Handle.



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TERRYVILLE, CONN.,
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THE ONLY PIN-TUMBLER PAD LOCK EVER PRODUCED.

It is self-locking and perfectly secure. It is made of brass and finished by our patented process. The above cut represents the only size yet made, but other sizes will be furnished as soon as the requirements of the trade are known.

For Sale by Hardware Jobbers Throughout the Country.

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Successors to Milo Peck, Manufacturers of

PECK'S DROP PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

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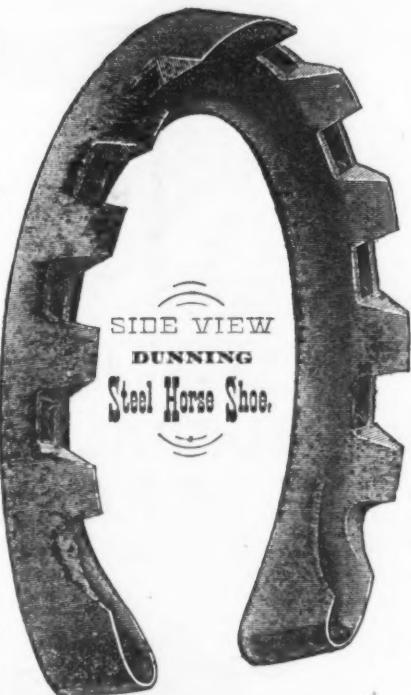
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20 West Lake Street, Chicago, Ill.

These shoes may be ordered in single or assorted sizes from the leading Hardware houses East or West. Among whom are:

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Dunning Sizes 4, 6, 8, 10.
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FOR ALL STATES EAST OF OHIO,

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These shoes are forged from a solid bar of steel.

Afford a natural, even bearing for the foot.

They will cure corns and improve tender feet.

Being a finished shoe it only requires the work of shaping and nailing on.

Send for sample keg (100 lbs.) assorted sizes.

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The Only Perfect Horse Shoe Ever Put on the Market.

THE TURNER & SEYMOUR MFG. CO.,

Torrington, Conn., and 298 Broadway, N. Y.,

MANUFACTURERS OF

Upholsterers', Stationers', House Furnishing & Fancy HARDWARE AND NOTIONS.

The Family and Triumph Egg Beaters, Judd's and other Patent Shade Fixtures, Picture Nails, Wire and Cord.

The Turner and Seymour Mfg. Co. have been longer in the business and make a greater variety of Cast Iron Scissors and Shears than any other concern in the world. Our

"AMERICAN" SHEARS

have long been conceded to be the best ever made. The quality and finish of these goods shall always be maintained.

We are now making a fine line of cheap

Nickel Plated Scissors and Shears, Nut Picks, Nut Crackers, Fruit Knives, Napkin Rings, &c.

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Prouty's Patent
PEERLESS FORCE
PUMP.

Has Self-Adjustable Foot Rest,
NEW AUTOMATIC COMPENSATING
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It will throw a continuous jet from
FORTY TO SIXTY FEET. A new pattern
jet and spray nozzle is sent with
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Especial attention is called to the
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LIST PRICE, \$8.

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SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting
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Cables and Bars warranted all steel.

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FOUR-POINTED BARBED WIRE FENCING.

We have large stock of Galvanized, Red and Brown Painted Barbed Wire on hand, and can fill all orders
promptly. Send for sample and prices.

A New Ironstone Field in England.

The probable duration of English iron ores has, within late years, proved an interesting theme for speculations and discussions, which are, perhaps, superfluous when we consider the fact that new and unexpected ore deposits are met with from time to time yielding sufficient material to meet the existing demands for years, lasting longer, in fact, than the coal deposits necessary for the smelting operations. The latest discovery is a vast area of ironstone on the estate of the Duke of Marlborough. The colites and the lins on which it rests have an uninterrupted range through Gloucestershire, Oxfordshire, Northamptonshire, Rutlandshire and thence into Yorkshire, and in all of these counties, it now appears, there are vast deposits of ironstone. In Oxfordshire the lower colites consist of forest marble, corabash limestone, slate and clay. The ores of the colites were first brought into notice by the discovery in Cleveland, little more than thirty years ago, and have been the means of forming one of the largest and most flourishing towns in the North of England. Some twenty-three years ago operations were commenced at this point, resulting in the erection of a couple of blast furnaces for the smelting of the ores. Northamptonshire is now second only to Cleveland as regards the tonnage of ore raised. A large field of ore has been found in Rutlandshire, and will, probably, soon be worked, the Midland Railway having commenced establishing communication with it. Oxfordshire should finally be noted as the latest addition to the few counties in which the ores of the colites are found. The clay ironstone of the classic system are, therefore, the most important in the kingdom. Of course, they are not to be compared with the hematites of Cumberland or Lancashire, so far as quality is concerned, but that is more than made up for by their vast extent and thickness, and these are qualities that are now considered of more importance than they have hitherto been, because these ores are well adapted for the direct process by which Bessemer steel is produced. The new workings in Oxfordshire are situated in the Great Western line of railway, so that there is direct communication on one side with Staffordshire and with South Wales on the other. A large quantity of ore is sent from Northamptonshire to South Wales, but as the Oxfordshire field is more advantageously situated there is no reason why it should not participate in the trade. It is said that the Oxfordshire stone contains a considerable quantity of lime, and this may be an advantage more than otherwise, everything of course depending on the actual amount. If there is more than is required for fluxing—as is the case in that worked at Frodingham in Lincolnshire—it will have to be manipulated with great care. At Frodingham the excess of lime was found to be a most serious matter, and those who commenced the smelting found it a costly process, and one that did not pay. But by experience, it was afterward found that by a careful selection of the stone, the iron was all that could be desired, so that there is really no difficulty which cannot be got over. In Oxfordshire the stone is no less than 15 feet in thickness, and this should give something like 18,000 to 20,000 tons to the acre, so that an ordinary royalty is likely to lead to a good annual income, and there should be no difficulty in disposing of a large acreage yearly. The stone is already being sent into Staffordshire, where it is mixed with the local ore, producing a metal that is suitable for either mill or foundry purposes. There are also other districts that should be made available, seeing that, as a rule, ironmasters in coal districts prefer the stone of the colites to that found in connection with the coal measures, which is of great thickness and does not give such a large percentage of metallic iron, while it also costs a great deal more in raising. Furnaces are about to be erected close to the field already opened on the property of the Duke of Marlborough, and these are to be constructed with all recent improvements. The furnaces and the smelting of the iron promise to be attended by several new and important features that will attract the attention of all English ironmasters, especially those in the North of England, who have hitherto made most of the improvements that have taken place in the smelting of ores similar to those that have been met with in Oxfordshire. If there is any drawback to the most complete success of the works, it must be as regards the finding of the best description of fuel. But that after all is perhaps only a minor matter. In South Yorkshire a large tonnage of coke of excellent quality is now being made for iron smelting, and it only takes about 25 cwt. of it to produce a ton of iron, and this could be easily sent over the Midland, and then put on to the Great Western at either Birmingham or Worcester. The new district will be the nearest place to London where iron is made, and that should be an advantage, while it is also in direct communication with South Staffordshire, which now takes a large quantity of pig from Derbyshire.

the country. It is no small honor to have turned out, in a comparatively few years, 200 graduates who are fitted to take their place among the world's useful workers.

Japanese Industries.

The British Consul at Hiogo and Osaka, Japan, states in his report on the trades at these ports during 1860, that though the foreign trade continued to increase, the year was a decidedly unprofitable one as far as imports were concerned. The deliveries of iron showed an increase of one-half, notwithstanding which the business was not satisfactory, as prices did not recover from the serious fall experienced at the beginning of the year. The Government works at Shinden were actively employed during the year on steamers and sailing vessels, and it has been decided to start composite and iron shipbuilding. In the engineering department eight pairs of new engines were made, comprising high-pressure, common jet-condensing, surface-condensing, and the newest style of high and low pressure surface condensing engines, with a total aggregate of 300 nominal horse-power. Eleven engines were repaired. Fourteen new marine high-pressure boilers were made and four repaired. During the year several large machines were added, including a long stroke planer, a large lathe, a hydraulic riveting machine, a new steam hammer, and a scrap iron furnace. Castings of all kinds, of brass or iron, from 6 to 7 tons weight, can be made, and all kinds of coppersmiths' work, including copper pipes of any diameter, are undertaken. The average number of men employed per day was 232, comprising pattern makers, molders, turners, fitters, boiler makers, blacksmiths and coppersmiths. The coke required is made on the premises from Japan coal. The Kobé Iron Works, owned by E. C. Kirby & Co., a British firm, were also busily engaged throughout the year. Nine steamers, with engines, boilers, &c., complete, were built, and repairs to a number of large vessels carried out, besides which there were made several land boilers, a quantity of mining machinery, and part of the machinery of a cotton mill of 3000 spindles at Osaka. The Kobé Iron Works give employment to 16 Europeans, 23 Chinese, and about 325 Japanese. The establishment was started seven years ago, and since that time much has been done to promote engineering by training native workmen in all branches of engine construction and shipbuilding. Japanese authorities have recognized the benefit resulting from these proceedings, and have shown themselves prepared, in all cases, to promote their success. It has been proposed to establish iron and shipbuilding works under skilled English management, intending to make them thoroughly complete, with all the latest improved appliances, and on a sufficiently large scale to meet the demand for works of considerable dimensions. Numbers of smaller shipbuilding yards and ironworks have been opened of late by Japanese firms, and it is expected that the increasing demand for the construction and repairs of small sailing and steam vessels will, in future, be promptly satisfied.

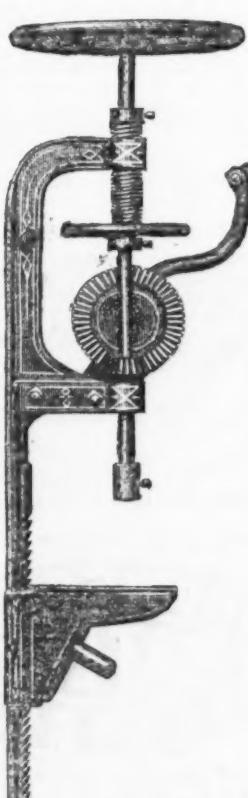
Very singular and amusing things happen out West. For example: Two years ago, says the Stockton (Cal.) Mail, water came into a mine operated by Mr. Wm. Utter, at Campo Seco, in such volume that work had to be stopped. To keep the large iron-bound and iron-baled bucket used to hoist rock from drying and falling to pieces, it was let down into the water. Next season, when it was drawn up, lo, a miracle! It was copper-baled! From this has sprung quite an industry, and the mine has been sustaining itself from water and ore ever since. The water contains an acid which has the property of taking into solution the particles of iron thrust into it, and it has also copper in solution, which is let go particle by particle as the iron is picked up. It is a simple chemical exchange, and this mine may make another profit still if it will get another chemical into the water which will make the acid lay down the iron which, as a black flood, the water carries down into the Stanislaus River. The copper industry consists in taking bundles of scrap iron and tin to the mine, where it is thrust into vats of the water caught up, in which the metals are soon changed into copper, the residue of the iron taking the form of a black stream and flowing away. To make sure of making the water swap all its copper for iron, which it is glad to do without boot, one vat is placed below, another down the bank to the river, and when the water escapes it has eaten its fill of iron, and left pay for its meal in genuine copper.

The House bill, reported by the Senate Post Office Committee, appropriates \$2,500,000 for mail service performed by steamships built in American shipyards, owned by American citizens or American corporations, and offered and manned by American citizens. They are to be divided into four classes: First, iron or steel screw steamships of not less than 4000 tons burthen, and capable of making a speed of at least eighteen nautical miles per hour. No vessel, except of this class, shall be accepted for mail service between the United States and Great Britain, and the rate of compensation for such vessels is limited to \$3 per mile for each outward bound voyage. The second-class ships are to have a minimum tonnage of 3000 tons and a speed of fourteen knots per hour; the third class, 2000 tons and thirteen knots, and the fourth class, 1000 tons and eleven knots per hour. The rates of compensation for the second, third and fourth classes are restricted to \$30, \$25 and \$20 per mile per annum, computing the distance only one way and upon the basis of one trip per month, or pro rata upon the basis of more or less frequent service.

The steamship Lord Collingwood, which sailed from this port on the 3d inst., was laden almost entirely with agricultural implements for Sebastopol and Odessa, and was engaged to meet the requirements of manufacturers here to deliver goods early in April for the agricultural season in Russia.

NEW IMPROVED
UPRIGHT DRILL

FOR
BLACKSMITHS AND MACHINISTS,



THIMBLE SKEINS, BLACKSMITHS' TOOLS, JACK SCREWS, &c.

MANUFACTURED BY

ILLINOIS IRON & BOLT

COMPANY,

CARPENTERSVILLE, Kane Co., ILL.

BUFFALO SCALE CO.,

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Manufacturers of

R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.

Send for price list, stating what you want.

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Manufacturers of

ROTARY KNIFE PEACH PARERS, GOLD MEDAL APPLE PARERS, SAFETY REVERSIBLE ICE CREEPERS, EGG BEATERS, MELTING LADLES, &c. Also,

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Stop Cocks & Galvanized

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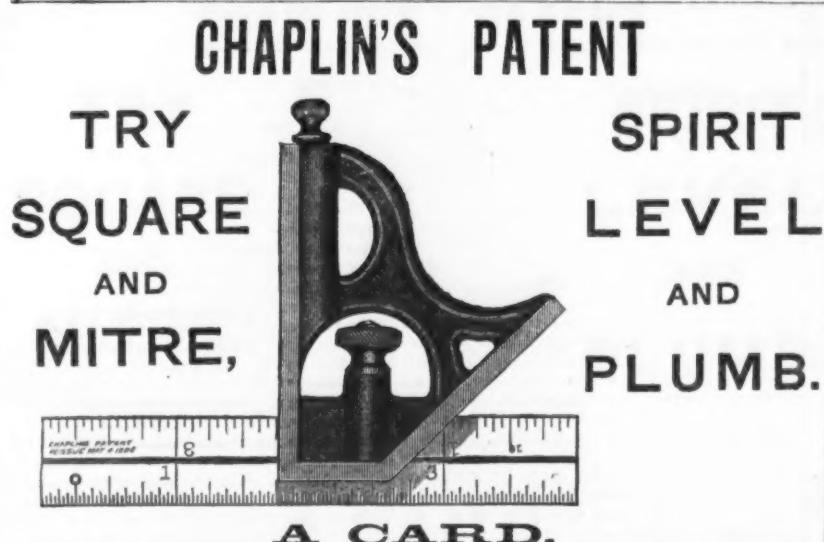
Manufacturer of

Ayer's Hydriants.

Stop Cocks & Galvanized

Lead & Zinc Supplies.

351 to 353 Clinton Ave., Brooklyn, N. Y.



This Tool is manufactured under the original patent granted O. R. Chaplin, May 8, 1866, reissued May 4, 1882, for a Combined Square and Bovel, having an adjustable or sliding blade drawn to its seat by a clamp bolt. The public are hereby cautioned against the sale or use of a similar tool made and put into the market by another party, fraudulently claiming the invention as his own, under the name of "Starrett's Patent Adjustable Square." Proceedings in the U. S. Court for the District of Massachusetts were commenced against said party for infringement of the Chaplin Patent in July, 1881, and a final hearing was reached at Boston on the second and third of January last. The case now only awaits the arguments and decision of Judge Lowell. The aforesaid pretended inventor has recently commenced a suit against us, apparently for the express purpose of trying to frighten dealers by threat of suit for damages from handling the Chaplin Tool. All we have to say to the trade in this matter at present is, that we shall firmly maintain whatever rights the Courts may establish in our behalf, and shall protect and defend all parties whomsoever in the use and sale of the Chaplin Tool manufactured by us.

STANDARD TOOL CO.,
ATHOL, MASS.

SOLE MANUFACTURERS AND OWNERS OF PATENT.



PERFECTION WINDOW CLEANER CO.
TO THE TRADE. *HANG THIS UP.*
Our price list for 1882 will be,
No. 1. Size, 2' 7" inch. \$2. 10. 3. 4. 5. 6.
Price, 30 cents, 35. 40. 45. 50. 55 each.
Discounts.—1 Gr. 25; 5, 30; 10, 35 per cent.
Handle Our Cleaner only—we own every Patent.
Our goods are for sale by all Large Dealers in Rubber, Woodenware, Fancy Hardware, Wholesale Grocers and Druggists. There is nothing in your line that is more salable or will pay you better to keep in stock.
PERFECTION WINDOW CLEANER CO. Chicago, Ill. U. S. A.

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Lightning Screw-Cutting Machinery and Tools.

Celebrated Lightning Screw Plates.

Lightning Bolt Cutters, both for Hand and Power, in great variety.

Taps and Dies for use in Machines, Screw Plates, Bit Brace, Drilling Machines, &c.

Green River Tire Upsetters,

Green River Horse Shoers' Vises,

Green River Drills,

Green River Tire Benders,

Tire Measuring Wheels, &c., &c.

Bit Brace Reamers, and other Labor-

Saving Tools, for Blacksmiths and Carriage Makers.

Send for Illustrated Price List.

ELBA IRON & BOLT CO., Limited.
MANUFACTURERS OF

MERCHANT BAR IRON,
Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge, and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

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HENRY'S PATENT UNIVERSAL CAN OPENERS.

Sample sent free for 30 cents.



For Round or Square Cans, for all Sizes. The verdict of all: "The best in the market."

SCOTT MANFG. CO., Sole Manufacturers, Baltimore Md., U. S. A.

M. D. SHIPMAN.
S. M. STEVENS.
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S. E. BRADT.
SAMSON WIRE STRETCHER
Patented Feb. 8, 1881, and Oct. 11, 1881.
For Sale by all Leading Jobbing Hardware Houses in the United States.
MANUFACTURED BY
Samson Novelty Works,
DE KALB, ILLS.

Send for Circulars and Price List, showing our liberal discounts to the Wholesale trade.

Patented Articles of
MALLEABLE IRON.
NEW pattern Heavy Screw Clamps: strongest in the market.



Hammer's Malleable Iron Oilers, 3 sizes.
Hammer's Mall. Iron Hand Lamps.
Hammer's M. I. Hanging Lamps.
Hammer's Adjustable Clamps.

For sale by all the principal Hardware Dealers.
Send for Price List.

MALLEABLE IRON CASTINGS
of superior quality, and Hardware Specialties in
Malleable Iron made to order.

HAMMER & CO.,
Branford, Conn.

NEW MAKE OF MINE
THREE DIFFERENT SIZED SPOUTS
SEND 15 CENTS FOR SAMPLE TO LEONARD BROS., SCRANTON, PA.
SEAMLESS BRASS COLLAR, BRASS HINGE, SOLID LID.
NO SOLDERING
HARD AND DURABLE
SCRANTON PA.
THE HINGE CANNOT MELT OFF.

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BUFFALO, N. Y.

Manufacturers of

BOLT CUTTERS
AND NUT TAPPING MACHINES,
(Schlenker's Patent.)

Send for Illustrated Catalogue.

THE PATENT SCREW WINDOW BALANCE
With which the Sashes work as
with weights, their application as
easily as a set of one-half
the cost of weighted weights, no
boxings being required. The
Sashes are Locked with the meet-
ing rail lock. Stands alone in its
class. Price, \$10.00 per pair.
Discount to the trade. In use over
three years. Robt. B. Huguenin,
Sole Maker. Hartford, Ct., U. S. A.

ZERO
REFRIGERATOR,
with Water, Wine and Milk Cooler. Best Food
and Ice Preserver in
the world. Send for
Book. A. M. JESLEY,
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Also the Rotunda Fis-
nace.

TELESCOPE TUBES.
Fine Mandrel drawn Tubes, from Brass or German Silver. Tubes for sliding glass within the other made to order. Manufactured by ROBT. T. DEAKIN & CO., 500 N. 15th St. Philadelphia, makers
of the American Improved Brass Garden Syringe.

BUFFALO CHAMPION
ICE CREAM FREEZERS.
FOUR STYLES.
FIFTEEN SIZES.

THE BEST
ICE CREAM FREEZER
IN MARKET.
Please send for Illustrated and Descriptive Price List.

Sidney Shepard & Co.
PROPRIETORS
BUFFALO STAMPING WORKS,
BUFFALO, N. Y.,
AND
CHICAGO, ILL.

The "Eureka" Pipe Cutter



THE BODY—is fitted with an adjustable Cast-Steel Jaw at the point where it comes in contact with the Pipe, which Jaw can be renewed at any time by simply removing one screw. By this system the wearing away of the Jaw (which in other cutters is the first part to give out) is effectually prevented, and this tool can be kept in first-class order at all times.

THE WHEEL BLOCK—This is also of Steel, neatly fitted to its socket and cannot be dropped out. It is much more durable than the cast-iron blocks and is hardened at the point where the rod comes in contact with it.

THE HANDLE—of this Cutter is put on to stay, and cannot be removed by the roughest usage, as it is an iron handle, cast fast to the Rod, operating the block.

—MANUFACTURED BY—

Pancoast & Maule { 243 & 245
SOUTH THIRD
STREET
PHILADA.

Covert Lariat Tether and Picket Pin.

Horse Tie.



Cattle Tie.



Covert's Celebrated Rope Goods,

CONSISTING OF
HORSE TIES, CATTLE TIES, HALTERS,
Cotton and Jute Double and Single Driving Reins, Weight Cords,
Hitching Cords, Lariat Tethers and Picket Pins.

All clamped with the PATENT COVERT STEEL RING CLAMP, and fully warranted and guaranteed. These goods are superior to anything of the kind in the market and are a great deal cheaper. Also COVERT'S PATENT HARNESS SNAPS, OPEN EYE BIT, CHAIN AND TRACE SNAPS, SWIVEL SNAPS, BREAST CHAINS, REIN CHAINS, &c.

Sold by leading Jobbers at Manufacturers' prices. Send for Catalogue and Price List.
COVERT MFG. CO., Sole Manufacturers,
WEST TROY, N. Y.

Steel for Shipbuilding.

BY ALBERT F. HILL, C. E.

Recent action in Congress tending toward the improvement of our naval force, has brought out not only the fact that many officers of the Navy are yet in doubt as to the advisability of using steel in the construction of vessels, but also that there exist doubts, in the minds of others as to the ability of American manufacturers to produce steel of the requisite quality for this purpose. The facts bearing upon the metallurgical industry of the country do not furnish any foundation for such doubts.

Naval architecture and her sister science, marine engineering, have, during the last decade, claimed the lion's share of public interest in mechanical progress. It is hardly more than a dozen years since the world marveled over the performance of the famous Spendthrift, winner of the great ocean "tear race" from Foochow to London, having made the passage in 95 days. To-day speed is reckoned by steam-power alone, and high-pressure engines have more to do with the quickness of the passage than beautiful lines and a big spread of canvas. So with the material of construction. The introduction of iron into shipbuilding was almost immediately followed by marked reforms, and the words of the late John Elder, of the firm of John Elder & Co., the largest shipbuilding concern in the world, have about come true, namely, that "cold iron alone was likely to do all the work." There is no question among experts to-day that the use of wood, not only in ocean vessels, but in river and lake boats, must soon give way to the use of metal altogether. In the great headquarters of shipbuilding—the Clyde—it is now noteworthy that the construction of wooden vessels is altogether unknown. All of the machinery in the large workshops has been erected specially for dealing with iron or steel, and no large concern could well take an order to build a wooden boat at any price.

The substitution of steel for iron marks another era of reform, and its success having been so eminently proved in France and England, it is certain to become the material to be mostly used in all large ocean vessels, where lightness of hull, as conducive to great speed, has to be considered. The first cost of a steel vessel is probably greater than that of an iron one, but the advantages which accrue subsequently are considerable; scantlings are reduced one-third, and in some cases even one-half, as compared with those used of iron. The Lloyds allow a reduction of 20 per cent. in scantling, and of 18 per cent. in weight, with steel, and this gives an increased dead-weight carrying advantage of 15 per cent. This advantage becomes all the more distinct in vessels used for carrying dead-weight cargoes and in men-of-war. A reduction in the weight of the frame admits of a corresponding increase in the weight of the armament, armor plating, machinery, &c. In order to give a steel ship the same defensive and offensive power as an iron one, it is not necessary to give it the same dimensions. Either the draft, the length or the breadth may be reduced, and either of these reductions is of great importance, whichever may be adopted.

At first firms were slow to believe in steel, but experience soon demonstrated its advantages, and showed the material to be more reliable than iron. In 1873 three large men-of-war were commenced at Brest and L'Orient by the French government, in accordance with the plans of the naval engineer, M. de Bussy, the pioneer of steel construction abroad. Steel was to form the principal part of the construction; the frames, the internal plating, the bulkheads, the decks were all to be made of steel. Their construction was so successful that three more ships were ordered in 1874 to be built of the same material. Now it is being used in the building of many large boats on the Clyde and at Barrow, for the Atlantic and other large carrying companies. The reasons why steel is so rapidly superseding wrought iron in structural works are to be found in the superior strength of the material, its greater uniformity, the ease with which it is produced in large masses, and in the economy of its manufacture. That cast steel is stronger than the wrought iron from which it is made, is a fact which becomes apparent by a consideration of the difference in the structure of the two materials.

Any mass of wrought iron must consist of two parts—the iron chemically combined with other elements, and a certain amount of cinder or slag, in layers or masses, which of necessity exists mechanically mixed in the iron, as the result of its mode of manufacture. Any large mass of wrought iron is further affected by welds, which must be formed in the production of the mass. The cinder or slag and the welds are such obvious elements of weakness, that the statement of their presence is sufficient to prove that the iron containing them cannot be in its highest condition of strength. Let such iron be thoroughly fused, however, and all of its component parts which have not been, or may not be, chemically combined with the iron, will either rise to the surface as scoria to be removed, or will become so completely dissolved in the molten mass as to cease to be elements of local weakness. There is every reason, therefore, why cast steel should be a stronger and more reliable material than wrought iron, and no reason why it should not be so. The correctness of this reasoning is borne out by the results obtained with the testing machine. The investigations of German, French, English and American engineers all point to the fact that in steel suitable for purposes of construction an ultimate tensile strength of 75,000 pounds, with an elastic limit of 42,000 pounds per square inch, may be safely counted upon, which is 50 per cent. in excess of the strength of the best wrought iron. Steel of this strength can always be produced so as to possess a degree of ductility and resilience equal to, and even in excess of, that of iron. The resistance to torsion and shearing in such steel is fully as much greater than that of iron, as its tensile strength is in excess thereof, while steel to be used under compression only, can be made readily so as to resist from three to

four times as much as iron. By what mode of reasoning, then, do the opponents of steel come to the conclusion that a material which presents a minimum resistance to tension, transverse strains, shearing and torsion must necessarily be less able to resist vibrations than the material which presents a minimum resistance to all of these strains.

In large structures steel is gaining ground with great rapidity, on account of the ease and certainty with which its chemical components may be regulated, thus insuring the easy production of any quality of material that may be desired. As soon as the requirements of the engineers are known, the steelmaker, after a few trials, can meet them—if they are within the limits of reason—knowing that as soon as that shall have been accomplished he will be able to reproduce the sample in any quantity and of any required size. The uncertainties of skilled manual labor, the danger from bad welds, bad puddling, or irregular stock, never enter into his calculations. The steel may be kept in a state of fusion for a length of time that will enable the operator to approximate by well-known tests its chemical composition, and such changes of composition may be made while it is in fusion, as may be necessary, thus insuring practical uniformity in various pieces as well as conformity to specifications. As there is no practical limit to the quantity of steel that can be melted at one time, as such steel may be made to run by gravity to any point within reach of the cranes necessary to handle the mass, and as the steel can be put into shape without a large number of skilled hands, it is evident that as we go above the weight of a蒲de ball in any required mass, economy, ease of production and certainty of quality are all greatly in favor of cast steel over wrought iron—the ratio in favor of steel increasing much faster than the weight. The ability to regulate the chemical character of any piece of steel is most readily availed of in the open-hearth process, but to be made entirely useful, engineers and constructors must be brought to a full knowledge of that fact, as well as of the effects to be expected from any given composition. Thus far the chemistry of steel is conspicuous by its absence from the specifications of engineers. This, of course, is largely due to the newness of the subject, but enough ought to be known certainly to impress them with the importance of the matter, and to convince them that success in steel construction depends largely upon the degree of attention paid to the chemistry of the material. The "carbon line" of course, takes precedence over all other combinations, and is the true basis to start from; but other elements have their value also, and next to the "carbon line" the effects of the manganese in combination with the carbon is most deserving of study and investigation. The importance of a knowledge of the mechanical effects, due to the chemical composition of the steel, is well illustrated by the following instance*:

In 1877 the Pennsylvania Railroad Company removed an old bridge from its line at Duncannon, Pa., built intermediate piers and erected shorter spans of the Pratt truss type, which had previously been in use on another portion of the road. The design of this truss would not admit of diagonals larger than 1 1/2 inches diameter, and in order to stiffen the bridge somewhat, steel rods were introduced for the main diagonals in the first and second panels, 1 1/2 and 1 3/4 inches diameter respectively. It was specified for the steel rods:

Elastic limit, lbs. 45,000
Tensile strength, lbs. 80,000
Elongation, per cent. 30

The steel was procured without difficulty, and it allowed a factor of safety of 2 1/2 at elastic limit, while a similar factor of 2 1/2 had for a long time been successfully used for iron. In the course of three years, from time to time, six of these steel rods broke, three of them being 1 3/4 inches in diameter, and three 1 1/2 inches in diameter. The broken rods were tested, and three of them analyzed at Altoona to ascertain the cause of failure, and what modifications should be made in the steel for such service. Examination showed that all the rods were broken in detail close under the nut; the threads were well cut and properly rounded at the root. In testing the rods, micrometer screws, reading to 0.0001 inch, with electric bell to signal the contact, were attached to the test pieces, and by this means the modulus of elasticity and elastic limit accurately obtained. Below is representative test:

Modulus of elasticity 45,000,000
Elastic limit 45,000
Tensile strength 85,000
Elongation in 5 inches, per cent. 23
with very slight variations in the different rods. Analyses of these rods showed:

No. 1. No. 2. No. 3.
Carbon 0.36 0.315 0.298
Phosphorus 0.051 0.041 0.049
Manganese 1.437 1.418 1.448
Silicon 0.052 0.033 0.043

This is a case where elastic limit, tensile strength and elongation are not reliable criteria of the fitness of the steel for the service, the modulus of elasticity, so very important and yet so generally neglected, rendering it unfit without showing any deviation from the specifications. The rods did not fail because they were of steel, but because they were of the wrong grade of steel. Now, tests to ascertain the modulus of elasticity with anything like accuracy, are altogether beyond shop practice; but had the specifications included, or, rather, also referred to the chemical composition of the steel, the result would have been different. The carbon, as shown by the above analysis, was all right, but the steel was too high in manganese. A quick analysis made at the works before the acceptance of the steel would have shown this, and been of more practical value than the analysis after failure. As regards the ability of American manufacturers to produce steel of the required site quality for the frames, as well as the hulls, of vessels, it is a fact well known to those in position to judge correctly and impartially, that English manufacturers have vainly tried for years past to produce low-carbon cast steels equal in both strength and ductility to American steels. Besides certain advantages in details of plant, which we owe probably quite as much to American enter-

*Paper by John W. Cloud, Altoona, Pa., read at the Philadelphia Meeting of the American Institute of Mining Engineers, February, 1881.

prise as to English conservatism, we have one natural advantage which is of incalculable value—namely, our charcoal irons, which are so admirably suited for melting.

It is exceedingly difficult to obtain reliable data on shop tests made on structural steels abroad, and with material intended for actual use in a structure. Probably the best record in our possession is the book of Lieut. J. Barba, chief naval constructor at L'Orient, who has given very valuable information of the tests made upon Terrenoire, Bessemer and Creusot open-hearth steel during the construction of the French steel ships before mentioned in this article. As the writer has had occasion to follow out a similar investigation of steel plates made from American open-hearth steel, it may be interesting to give here a comparison of the results obtained. The steel for these plates was made in a 15-ton open-hearth furnace, and the plates selected for testing were taken from different runs. (See Table I.)

TABLE I.—EXPERIMENTS MADE ON ROLLED "OPEN-HEARTH" STEEL PLATES.

American Steel.

Mark.	Carbon percentage.	Dimensions.	Tensile stress in lbs. per sq. in. in direction of rolling at—		Percent elongation—Average.	Remarks.
			Elas. limit.	Rupture.		
P. 1.	0.30	3/8 in. x 12 in. x 6 ft. long, tested in 15-ton furnace.	43,260	79,120	19.3	Fractures fine and silky.
P. 2.	0.30	3/8 in. x 12 in. x 6 ft. long, tested in 15-ton furnace.	44,820	77,840		
P. 3.	0.30	3/8 in. x 12 in. x 6 ft. long, tested in 15-ton furnace.	45,120	78,390		
P. 4.	0.30	3/8 in. x 12 in. x 6 ft. long, tested in 15-ton furnace.	43,990	77,970		
P. 5.	0.30	3/8 in. x 12 in. x 6 ft. long, tested in 15-ton furnace.	44,720	78,320		

French Steel.

| Not given. | Average, 57,380. | 24.1 | Fracture fine and silky. |
|------------|------------|------------|------------|------------|------------------|------|--------------------------|
| Not given. | Average, 69,160. | 6.4 | Fracture good. |

It is to be deplored that Mr. Barba neglected to state the analysis of the steel tested, but the translator of his book, the late A. L. Holley, assumes, for reasons stated, that the steel contained between .25 and .32 per cent. carbon.

The comparative results obtained on plates with holes drilled, punched and reamed, punched and annealed, cold punched, &c., is given in Table II.

TABLE II.—EXPERIMENTS ON O. H. STEEL PLATES WITH DRILLED, PUNCHED AND REAMED, PUNCHED AND ANNEALED, AND COLD PUNCHED HOLES.

American Steel.

Carbon.	Description of		Average ultimate tensile strength in lbs per square inch of effective service.	Per cent. Elongation of hole.
Per cent.	Plate specimen.	Hole.		
0.30	3/8-inch rolled plate, cut in planer on all edges.	Drilled, 1-in. diameter.	98,966	22.
0.30	3/8-inch rolled plate, cut in planer on all edges.	Punched, 0.935-in. diameter.	100,700	20.
0.30	Strips, 2 1/8 inches wide, 18 inches long.	Reamed and annealed, 0.935-in. diameter.	78,970	21.
0.30		Punched, 0.935-in. diameter.	66,108	3.1

French Steel.

Width of specimen, thickness not stated.	Drilled, 0.66 in.	69,300	
	Punched, 0.66 in.	55,560	
	Punched, 0.58 in.	68,040	
	Reamed to 0.66 in.		
	Punched, 0.50 in.	67,020	
	Reamed, 0.66 in.		
	Punched and annealed.	60,680	

It is hardly necessary to overburden an article like the present with tabulated statements. Suffice it to say that the experiments made on American steel showed that the conclusions of Mr. Barba, as to the effects of shearing, punching, drilling, annealing, tempering, &c., had on steel, were correct in a general way, and of the greatest value to the profession; yet the absolute results (in pounds of resistance per square inch) were, throughout, largely in favor of the American steel. With the amount of capital invested in steel plant in this country, with machinery in our leading bridge works which enables us to attain a precision of detail positively unknown abroad, it would seem that all that is really required to give to steel construction its proper place in public estimation is a wider dissemination of the knowledge of our extraordinary facilities in this direction.

The Smoke Nuisance in Montreal.

The people of Montreal believe that the way to suppress the smoke nuisance is to suppress it. The following announcement, published in the Montreal papers, might be copied with advantage by the common council of several American cities:

Public notice is hereby given that the following provisions of By-Law No. 130, passed by the City Council on the 13th February ultimo, will be strictly enforced, and that all persons found contravening against any such provisions shall be prosecuted according to law, viz.:

Sec. 1.—The proprietor of any house or building hereafter to be erected in the said city, the chimney of which shall not be more than 12 feet horizontally distant from any other chimney having a higher elevation, shall, at his own expense, to raise the height of such chimney to be erected as aforesaid to 6 feet above the apex or roof of the said house or building having such higher chimney, so as to prevent accidents by fire from the escape of sparks from said lower chimney; but in the event of the building having been constructed previously to the more elevated one, then the proprietor of the more elevated building shall, at his own expense, and with due diligence, raise the said chimney of the lower building to the height of his own chimney; but in the event of the lower chimney being found too frail to support with safety the pressure of the new portion of chimney required, then, in that case, the lower chimney shall be entirely demolished and rebuilt adjoining the gable of the said more elevated building.

weights required for rupture of apparently identical wires; still, the mean values in each of the fourteen series were from about 1 to 3 per cent. greater for the magnetized than for the unmagnetized wires, showing that the tenacity of iron increases on magnetization.

The Scotch Iron Trade.

The iron trade of Scotland is at the present time in an unusually promising condition, and though it cannot, perhaps, be said that the expectations of manufacturers have been fully realized, it must be admitted that the demand has been on an extending and extremely gratifying scale. There are now 106 furnaces in blast, against 121 at this time last year, and the shipments of pig iron have been characterized by a steady increase in bulk, being as follows for the week ending February 24: Foreign, 7083 tons; coastwise, 3850 tons; total, 10,933 tons, against 7405 tons in the corresponding period of last year. Until the close of the past year, it was hardly believed the restriction of the output of Scotch and Cleveland blast furnaces would have any appreciable effect on the large stocks of iron then on hand, but now the united policy of the ironmasters is undoubtedly beginning to produce its effects. During the past month the stocks have been diminished by some 2000 or 3000 tons, and there seems to be no reason why the decrease should not continue at least during the whole of the present month. It is now generally understood among Scotch ironmasters that the present restriction will be continued for some time, and there are prospects that an additional number of furnaces will be blown out, the reduced make being sufficient for all present requirements. Although the want of shipping accommodations and the extensive rise in freights have somewhat checked the shipments of Scotch iron to the United States, consignments during February are reported to have been very good, and it is probable that fair shipments will continue to be made. The prospects in connection with the trade with France and Italy are highly encouraging, and manufacturers doing business with Germany report that an increased number of orders is shortly expected. While the bulk

Special Notices.

To Buyers of Table Cutlery.

E. BISSELL & CO.,
WHOLESALE AUCTIONEERS.

Large, Special and Peremptory Sale
By Order of the Cutlery Association
of the United States,
—OF—

American Table Cutlery,
Carvers and Butcher Knives,
a.c., a.c.,
Second Quality,
ON WEDNESDAY AND THURSDAY,
March 29th and 30th, 1882,
A o'clock a.m. each day,
AT OUR SALESROOMS, 83 CHAMBERS
AND 65 READE STS, NEW YORK.

As this is the first sale made by the CUTLERY ASSOCIATION this year, it will be very important one for all buyers of TABLE CUTLERY, as it will comprise all articles of good Table Knives and Forks, a variety of patterns, in Ebony, Cocoa and Bone, of the manufacture of the Lamson & Goodnow Mfg. Co., Landers, Frary & Clark, the Frary Cutlery Co., Meridian Cutlery Co., J. Russell Cutlery Co., American Cutlery Co., and the Beaver Falls Cutlery Co. Also full line of Butcher Knives, Butter Knives, Carvers, Ivory Cutlers, Table Steels, &c., &c. Also standard-drawn Tea and Table Spoons in Forks, plated on 18 per cent Nickel, standard and guaranteed plate. Several hundred dozen Plated Steel Knives, 8, 12, 13 and 16 oz. plate. Also a large invoice of Solid Steel Jappanned and Nickel Plated Straight and Bent Trimmers and Barber's Shears, Pocket Cutlery, &c., &c.

Buyers who cannot attend the sale can forward their orders, and goods will be sent forward without extra charge. Purchasers of Cutlery should not neglect this opportunity to replenish their stocks at these prices, as they will probably not have another such chance this season. Catalogues will be ready by March 29th, and will be sent to those who desire them. The entire Catalogue will be sold without reserve.

FOR SALE—A thriving Hardware, Crockery and Housefurnishing Goods business. Business established nearly 30 years, and the largest trade done in 1881, of any year since established. Stock in clean, neat shape, no dead stock; will invoice from \$24,000 to \$6,000. No one can apply unless they have capital and energy to keep the business up, as the proprietor can and will continue it unless the right person is found to sell to. Address for one month, ILLINOIS,
Office of The Iron Age, 83 Reade St., New York.

NOTICE.

We are in position to handle Heavy Hardware, Iron and Steel goods for manufacturers, and are ready to correspond with those who desire to place their products on sale at this point.

STEWART & LAWSON,
Railroad and Machinists' Supplies,
186 West Second street, Cincinnati, Ohio.

A Young Man

Of 27, who has had nine years' experience in the Iron business, desires a situation. Had charge of charcoal furnace and forge two years. Has had experience at mines. Understands bookkeeping and correspondence. Best of references from present and former employers. Address, IRON,
Office of The Iron Age, 220 S. 4th St., Phila., Pa.

Wanted.

To confer with a thorough engineer by parties who are interested in the manufacture of Iron and Steel in all its branches, Crucible, Open-Hearth and Bessemer. No one need apply who is not strictly practical and capable in every detail, and competent to take entire management. Liberal compensation guaranteed.

Address, C. J. M., P. O. Box 1278, New York, giving reference.

Situation Wanted

By a thorough Hardware man. Will be open for engagement May 1st.

Add est. J. R.
83 Fountain St., Providence, R. I.

Wanted.

An experienced Hardware Salesman, who can command a trade, to travel through New England. Address HARDWARE,
Box 180, Boston, Mass.

Resident Buyer.

A party having had about 13 years' experience in New York City in the Hardware, Iron and Steel business, is desirous of representing a first-class Southern and Western houses as resident buyer, either on salary or commission. Is acquainted with all the leading manufacturers. Can furnish satisfactory references. Address, S. J.
Office of The Iron Age, 83 Reade St., New York.

OFFICE OF

LOWRE & TUCKER,

MANUFACTURERS OF

MRS. KNOX NO. 99, CROWN JEWEL
AND REGAL

FLUTING MACHINES

And other Light Machinery.

393 Mulberry Street, Newark, N. J., March, 1882.

As our Mr. Lowerre intends to retire from business, he will sell out his half interest to any gentleman of respectability and means that may be acceptable to Mr. Tucker.

LOWERRE & TUCKER.

Retail Salesman Wanted
In the Retail Department of a New York City Jobbing Hardware and Cutlery House. An energetic salesman. Must be familiar with the wants of the city, and not afraid of work.

Address, giving references and former position,
THOMAS,
Office of The Iron Age, 83 Reade St., New York.

Situation Wanted

In a Wholesale Cutlery and Hardware House, Sixteen years' experience. Reference. Address CUTLERY.

Office of The Iron Age, 220 S. 4th St., Phila., Pa.

WANTED.—A position by a thorough hardware man aged 45; has held positions as follows: Purchaser, Salesman, Traveler, Bookkeeper, Cashier, Secretary. First-class in all, with best testimonies. Address,

"HARDWARE," 56 West 131st St., New York.

PILL PRESS FOR SALE.—A new Upright Power

Dial Press, swings 22 inches, back geared, quick return motion, steel spindle and shaft, superior finish; weight, 1000 lbs. Price \$1,000.

PEERLESS PUNCH AND SHEAR CO.,
115 W. Liberty St., New York.

Special Notices.

For Sale.

Palo Alto Rolling Mills,

Near Pottsville, Pa.,
ON THE MAIN LINE OF THE POTTSVILLE

AND READING RAILROAD.

These mills are in good repair, and can be sold for \$10,000.

Hole for T-tube, 12 to 25 lbs. per yard, and for Street Rail, 18 to 70 lbs. per yard.

Guide Mill Train for Merchant Bar, 3/4 to 1 inch.

Rolls for Merchant Bar, round and square, up to 4½ inches.

Number of Puddling Furnaces in both mills,

3; Heating Furnaces, 9; all with boilers at achen.

Also Foundry, Machine Shop, Blacksmith Shops,

100 H. P. Horse, Rolling Mill, Carpenter and Pattern

Shops, Stables, handsome Dwelling for Superintendent, 11 Tenant Houses, a Brick Office, and

Ample grounds for stock and cinder.

For further particulars address

Messrs. LEE & McCAMANT, Extr.,
Pottsville, Pa.

THOS. F. WRIGHT, 1834 Race St., Philadelphia, Pa.

HUGH W. ADAMS, 56 Pine St., New York.

Manufacturing Property for Sale.

The Real Estate of the late Foundry and Machine Company of Taunton, Mass. Building consists of Foundry, Machine, Erecting and Blacksmith Shops, and covering about 60,000 square feet of ground. For particulars apply to

THE GEORGE PLACE MACHINERY AGENCY,

121 Chambers St., New York.

Car Works for Sale.

Present output about five cars daily. Either a personal interview, or full particulars may be obtained, by addressing the owner, X. Y. Z., Office of The Iron Age, 83 Reade St., New York.

For Sale.

Iron Shapers, 7½ inch stroke, adjustable while in motion. Price, \$250 net, f. o. b. Send for photo. Address

NIAGARA STAMPING AND TOOL CO.,
Buffalo, N. Y.

For Sale.

Second-hand DROPS and LIFTERS.

BEECHER & PECK,
Lock Box 122, New Haven, Conn.

Foundry & Machine Shop Property
FOR SALE BY AUCTION.

Will be sold on the premises, April 12 next, at 12 m., all the Real Estate, Foundry and Machine Shops, with all Fixtures and Tools belonging to the FAIRHAVEN IRON WORKS, in Fairhaven, Mass., unless the same has been previously disposed of at private sale.

They are situated and well adapted for carrying on a large Foundry and Machine Shop business, and has excellent freight facilities to either New York or Boston. \$1000 to be paid at time of sale. For particulars address

JOHN C. TRIPP, Treasurer,
Fairhaven, Mass.

WANTED.—A thorough engineer by parties who are interested in the manufacture of Iron and Steel in all its branches, Crucible, Open-

Hearth and Bessemer. No one need apply who is not strictly practical and capable in every detail, and competent to take entire management. Liberal compensation guaranteed.

Address, C. J. M., P. O. Box 1278, New York, giving reference.

WANTED.—Second-hand MACHINERY

One 4000 to 5000 lb. Steam Hammer, 36 to 48 inch

One Horizontal Engine, 24 to 30 inch cylinder and from 42 to 48 inch stroke.

One Lever Shear to cut steel iron up to 15 inches wide.

Answer by letter, giving full particulars, with price and terms to

NATIONAL TUBE WORKS CO.,
McKeesport, Pa.

WANTED.—Second-hand MACHINERY

One 4000 to 5000 lb. Steam Hammer, 36 to 48 inch

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One 4000 to 5000 lb. Steam Hammer, 36 to 48 inch

One Horizontal Engine, 24 to 30 inch cylinder and from 42 to

following circular from the Pennsylvania Coal Co., dated 18th inst.:

Present prices for fresh-mined Pittston Coal, for immediate delivery at company's Coal docks, Newburgh:

Lump, per ton of 2240 lbs	\$3.95
Steamer, " "	3.85
Grate, " "	3.75
Egg, " "	3.80
Stove, " "	3.95
Chestnut, " "	3.90
Pea, " "	2.85

Fifty cents per ton additional for delivery at New York.

The effects of this circular will scarcely be apparent for a week or two. Meanwhile, there is no disposition to make contracts ahead, for if prices advance buyers find an excuse for backing out, and if they decline buyers will call for more than can be delivered. Contracts made last week would not be entered into now as matters look at present. Labor troubles, real or apprehended, are the principal source of difficulty.

In Bituminous Coals Cumberland is out altogether, leaving Clearfield in undisputed possession. Broad-top, semi-bituminous, is quoted \$4.75 on board at Amboy, and other descriptions vary but slightly. Little change is expected until the Cumberland strike comes to an end. A good demand is noticed along the line of the roads, as the iron furnaces are burning heavily and there is little disposition to ship more than is necessary, so long as better prices can be had at the mines.

Freights to Eastern points have weakened, and the rate to Boston is now quoted \$1 @ \$1.10; Portland, 90¢ and discharged; Portsmouth, \$1.25. Less business is doing than a week ago. The Morris Canal opens on the 29th, but the date of the Lehigh's opening has not been announced.

The total tonnage of Anthracite Coal from all the regions for the week ending March 11, as reported by the several carrying companies, amounted to 385,126 tons, against 600,026 tons in the corresponding week last year. The total amount of Bituminous mined for the year is 943,014 tons, against 758,034 tons for the corresponding period last year, an increase of 184,980 tons.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	W. D. \$1.00	10.16
" light	"	10.14
Copper Bottoms	"	10.14
Yellow Metal	"	10.20
Brass, heavy	"	10.12
Brass, light	"	10.10
Composition heavy	"	10.15
Lead, heavy	"	10.16
Tea Lead	"	10.04
Zinc	"	10.04
Powder, No. 1	"	10.13
Powder, No. 2	"	10.08
Wrought Iron	Wt. \$1.00	10.25
Light Iron	"	10.20
Stove Plate	"	10.10
Machinery do.	"	10.10
Grate Bars	"	10.10
Electrolytic plates	W. D. 0.04	10.00
Stereotype plates	"	0.05
Small type	"	0.06

The prices current (prices paid by dealers for Rags, &c., are as follows:

Canvas, Linen	W. D. \$1.00	10.04
White Cotton, New	"	10.02
White, No. 1	"	10.02
" No. 2	"	10.02
Seconds	"	10.02
Soft Woollens	"	10.02
Mixed Rags	"	10.02
Gunny Bagging	"	10.02
June Cloth	"	10.02
Kentucky Bagging	"	10.02
Book Stock	"	10.02
Newspapers	"	10.02
Waste Paper and Scraps	"	10.02
Kentucky Bale Rags	"	10.02

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements for the past week:

IMPORTS.		
For the week ending March 18:		
1880.	1881.	1882.
Total. \$12,724,151	\$9,485,370	\$11,334,938
Prev. reported 93,499,763	80,020,480	95,959,275

Included in the imports were articles of merchandise valued as follows:

Quantity.	Value.
Anvils	20 \$155
Brass rods	10 400
Bronzes	16 4,471
Chains and Anchors	52 2,823
Clocks	27 4,635
Copper	186 55,227
Guns	160 23,656
Hardware	52 2,690
Iron, pig. tons	5,332 110,010
Iron rods	11,457
Railroad bars	860 10,000
Iron ore, tons	805 2,440
Iron, other, tons	4,733 106,336
Lead, pigs	8,000 7,122
Machinery	34 9,817
Metal goods	1,033 30,777
Needles	73 4,230
Nickel	7 2,900
Nails	142 4,685
Old metal	22,747
Pins	1 1,664
Platinum	1 2,220
Plated ware	5 397
Saddlery	13 3,722
Steel	77,535 213,523
Speier	105,510 6,604
Silverware	12 5,307
Tin, boxes	25,879 371,803
Tin, slabs, 3,403; 275,717 lbs.	107,750
Wire	15 4,433
Zinc	345,007 15,480

The following are the imports of leading articles, compared with previous dates:

For the	11 weeks	Same
week.	of 1881.	time 1882.
Cutlery, pkgs.	186 1,681	1,757
Hardware, pkgs.	51 268	286
Iron, R. K. bars.	896 33,001	15,073
Lead, pigs	200 5,096	—
Steel, pigs	77,535 413,382	154,653
Tin, boxes	25,879 304,775	27,497
Tin slabs, lbs.	270,747 1,120,022	4,592,834

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended March 18:	Quantity.	Value.
Total	\$26,235	12,344,743
Previously reported	12,344,743	—
Total since January 1, 1882.	\$12,465,983	—
Same time in 1881.	—	8,780,585
Same time in 1880.	—	15,080,346
Same time in 1879.	—	4,977,558
Same time in 1878.	—	11,630,929
Same time in 1877.	—	15,080,346
Same time in 1876.	—	15,080,346
Same time in 1875.	—	7,530,874
Same time in 1874.	—	13,520,303
Same time in 1873.	—	4,613,385
Same time in 1872.	—	—

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended March 18:	Quantity.	Value.
Total	1880.	1881.
Prev. reported	\$8,146,413	\$7,800,595
Total	62,454,047	67,151,901
Previously reported	67,151,901	\$5,109,663

Since Jan. 1... \$70,000,460

8,519,586

71,244,280

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending March 21, 1882:

Danish West Indies.

Quan.	Val.
1. r. gds. pkgs.	1,873
B.R. g. gds. pkgs.	1,103
Clocks, bxs.	11 92
Mach'y. pkgs.	9 293
Iron, pkgs.	13 139
P'tim., gds.	1,500 115
Mf. iron, pkgs.	11 269
Hdw. pkgs.	11 593
Ptms., gds., per 17,000	1,897
Steel, gds. pkgs.	2 25
Pumps, gds. pkgs.	2 50

Hamburg.

Quan.	Val.
Ptms., gds., per 17,000	1,897
Iron, iron, pkgs.	250
Clocks, bxs.	11 131
Mach'y. pkgs.	11 131
Iron, m. gds.	11 131
Hdw. pkgs.	11 131
Ptms., gds., per 17,000	1,897
Steel, gds. pkgs.	11 131
Clocks, bxs.	11 131
Mach'y. pkgs.	11 131
Iron, m. gds.	11 131
Hdw. pkgs.	11 131

Bremen.

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Manufactured Iron.—The situation remains much the same as a week ago. New business continues comparatively light, for which there are good and sufficient causes, as noted elsewhere, but the mills are all fully employed on old contracts. Some of them have orders enough booked to keep them in operation for from 30 to 60 days. Prices unchanged: Bars, 2.50¢ rates; Sheet, 4.30¢ for No. 24; Tank, 3.30¢; Boiler Plate, 5.5¢; Skelp, 2.90¢ @ 3¢. The Western Iron Association meets here on the second Wednesday in April, and while the meeting will not doubt be largely attended, it is pretty safe to assume that there will be no attempt made to advance prices.

Nails.—There is nothing new to note in connection with this important interest. While business has not yet come up to the expectations of some of the more sanguine, it is all that can be expected in view of the mud embargo in the West and floods in the South. Prices unchanged: \$3.40, 60 days, with an abatement of 10¢ $\frac{1}{2}$ kg on carload lots and upward, and 2¢ off for cash.

Wrought Iron Pipe.—The demand continues light, and no material improvement is looked for until the weather becomes settled so that out-door work can be resumed. No change in prices; discounts on Gas and Steam Pipe, 60 @ 60 and 5%; on Boiler Tubes, 40 @ 40 and 5%; Oil-well Casing 75¢ $\frac{1}{2}$ foot, net; ditto Tubing, 25¢.

Steel.—There is a continued good demand, and prices are steady: Best brands of Refined Cast Steel, 12¢; Crucible Machinery, 8¢; Open-hearth ditto Machinery, 5¢; Hammer Cast Steel, 9¢; Spring Cast Steel, 7¢; Bessemer and Open-hearth Spring, 5¢; ditto Plow, 5¢; Steel Boiler Plate, 6¢ @ 7¢.

Rails, &c.—Steel Rails continue dull, and while summer delivery is still quoted at \$57 @ \$58, it is intimated that sellers could be found at considerably less. The trouble at the Homestead Rail Mill, it is believed, has been brought to a close, and it is expected that the works will be in full operation within a few days. Spikes, Bolts and Splice Bars unchanged, with only a fair business.

Scrap.—Is reported dull, and prices are weak. Stocks in hands of dealers are reported light, but some of the mills are said to be pretty well supplied. Wrought is quoted at \$22 @ \$33 $\frac{1}{2}$ net ton, the outside figure for selected Railroad; Car Axles and Car Springs, \$39 @ \$40; Wrought Turnings, \$23 @ \$24; Crop Ends dull, \$30 @ \$31, gross, and Car Wheels are offered in large blocks at a material decline, \$29, gross, with no demand.

Window Glass.—The demand for immediate delivery is only fair, but the prospect is regarded as being very favorable for a good late spring and summer trade. Some manufacturers report considerable inquiry for future delivery. Prices firm, but unchanged. Carload lots and upward, discount 60, 10 and 5% on single, and 70% on double strength.

Coke.—The advance in freight eastward has curtailed shipments in that direction very materially. Eastern furnace men who have been using Coke have gone, or threatened to go, back to Anthracite Coal again, rather than pay the advanced freight rates. As a result, there is now an abundance of cars for Western shipment, but a continued scarcity of motive power to move the same. The probability is that the freight rates East will be reduced again, as the railroads will soon discover their mistake. Prices unchanged at \$1.75 @ \$2 $\frac{1}{2}$ ton, delivered free on cars at ovens. The railroads, it is said, are now able to move 65,000 tons per week, but unless the Eastern demand revives, there will not be so much required, and, as a consequence, an accumulation of stock in first hands will result.

Coal.—The Coal trade of Pittsburgh continues very unsatisfactory, owing to the depressed condition of the market below, where Pittsburgh Coal is being offered at about lay-down cost, and hard to sell at that. There has been good water for running Coal the greater part of the winter, and this accounts for the stocks in all the down-river markets being unprecedented.

CHICAGO.

Office of *The Iron Age*,
36 and 38 Clark Street, cor. Lake Street,
CHICAGO, March 20, 1882.

Hardware.—Notwithstanding the bad condition of country roads in the West, the amount of business transacted during the week in Shelf and Heavy Hardware has been very satisfactory and the market generally shows a firm feeling.

Stocks of Nails in the hands of dealers here are light, while the demand continues to increase. We quote as follows: \$3.40 $\frac{1}{2}$ kg for rod, to 60d, for carload lots, and \$3.50 for smaller orders, with the usual discount off.

In a catalogue embracing price lists and illustrations of some of their leading specialties, just issued by the Payson Mfg. Co., they call attention to their Bular Proof Sash Locks and Anti-friction Casters. They have added largely to their line of Locks and Casters, and, having increased their facilities, are in position to meet the wants of the trade in their line promptly.

Mr. R. T. Whelby, 131 and 133 Lake street, sends us descriptive circular of a Drum Hose Cart, of which he is the manufacturer, in which he says: "This cart is provided with a cylindrical drum, on which the hose is wound to prevent it from cracking, and to allow the water to pass uninterruptedly through it, and is furnished with a ratchet device, to retain the reel as fast as the hose is wound thereon; also adjustable clamps for holding the various sizes of hose in use, and a spring clamp to grasp the nozzle, making it one of the best reels in the market." We quote price list and discount to the trade:

Reel O takes 50 ft. 1-in., or 75 ft. 1/4-in. Hose, each \$5.00
Reel H takes 100 ft. 1-in., or 150 ft. 1/4-in. 6.00
Reel H takes 150 ft. 1-in., or 250 ft. 1/4-in. 6.00
Hose, each 7.00
Reel O, no drum, lever to hold reel steady instead of ratchet, takes 50 ft. 1-in., or 75 ft. 1/4-in. Hose, each 3.50
Discount, 33 1/3% off.

Pig Iron.—The demand for Pig Iron during the week has been good, while the

market holds about the same position as at our last writing, and quotations remain as yet unchanged, as follows: Lake Superior Charcoal, Nos. 1 and 2, \$31 @ \$32; No. 3, \$33; Nos. 4, 5 and 6, \$34 @ \$36. Calumet, \$28 @ \$29; Silvery Soft, \$26 @ \$27; Crane, No. 1, \$29; No. 2, \$28.50; Thomas, \$25.50 @ \$30; Imported Scotch, \$30 @ \$31, and American Scotch, \$27 @ \$30.

The situation at the Union Iron and Steel Company's works has shown no new features during the past week. The furnaces are still blown out, and at present nothing definite can be said as to when work will be resumed.

Manufactured Iron.—We have no new features to report in this market; prices are firm and the demand excellent. We quote: Bar, 3¢; Angle, 4¢; T, 4¢; Beams and Channels, 4¢ @ 4¢; Hoop at 3.80¢ rates. Sheet, Plato and Tank, 10 to 14 gauge, 4¢; 15 to 17 ditto, 4.30¢; 20 to 21 ditto, 4.60¢; 22 to 24 ditto, 4.80¢; 25 and 26 ditto, 5¢; and 27 ditto, 5.20¢. Patent Cold-rolled Shafting, dis. 20%; Norway Iron, Original Bars, 5¢ rates; Norway Iron, re-rolled, 5¢ rates; Ulster Iron, 4¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 7¢ off list; Wrought Boat Spikes, 4¢ rates.

Steel.—The demand for Tool Machinery and Agricultural Steels during the week has been good, Plow Steel being in special demand, quotations are firm as follows: Tool, 12¢; Machinery, O. H., 5¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 7¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢. Sheet, first, second and third quality, 12¢, 10¢ and 8¢, respectively; Crucible Plow, 6¢; Eagle Plow, 5¢; Iron Center Plow, 10¢; and soft Steel Center Plow, 10¢.

Scrap Iron.—The Scrap Iron market has shown no improvement over our last report. We quote (dealers' purchasing prices): No. 1 Wrought Scrap, \$24, net ton; No. 1 Railroad Scrap, \$27 @ \$28; ditto Heavy Cast, \$19; ditto Stove Plate, \$14; ditto Cast-iron Borings, \$9 @ \$10, and ditto Machine Shop Turnings, \$12 @ \$13.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, March 20, 1882.

General trade in the South shows no features of special interest. There is much activity in erecting new factories of various kinds, and farming operations are attracting more attention than usual among Northern men who have money to invest in large schemes. The weather continues warm and not so wet, but still too much water falls to suit planters and others engaged in out-door business.

Pig Iron.—Prices are steady at the last reduction. The Chattanooga furnace is to be overhauled and enlarged to about 500 tons per week. The old Bartow stack, being rebuilt at this place, will be 15 feet diameter of bosh, have a new and powerful engine and be thoroughly modernized in all respects. The out-put of Pig Iron in the South will be greatly increased during this year. We quote: No. 1 Foundry, \$24 @ \$25; No. 2 Foundry, \$22 @ \$23; Gray Forge, \$20 @ \$21; White and Mottled, \$19 @ \$20; Carbon Steel, \$33 @ \$37.

Ores.—We quote: 50% Brown Hematite, 8¢ ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails are steady at \$29; Wrought Scraps, \$20 @ \$23; Cast Scrap, \$13 @ \$15; Old Wheels, \$28 @ \$29.

Nails.—We quote at \$3.40 rates, usual discount for cash and large orders.

Manufactured Iron.—We reduce the quotation for Bar to \$2 for carload and larger lots. Smaller bills are \$2.75. The Bar Iron market is steady and the demand good. We quote: Railroad Spikes, \$3.40; Track Bolts, \$4; Fish Plate, \$3.

Coal.—Fancy Lump, \$4; Common, \$3; Run of Mine, \$2 at mills.

Steel and Iron Rails.—Steel we quote at \$60 as an outside figure; Iron, \$48 @ \$50, heavy and light sections, and practically nominal; Small T, \$55 @ \$57.

BOSTON.

MARCH 18.—The market has not shown much animation during the week, and the volume of business is small. There is no disposition to buy any large amount of Iron, and it is not very well supplied. This indifference on the part of buyers shows that they have not much faith in the steadiness of prices. There is no doubt of the fact that the mass of consumers are looking for lower prices, and the fact that the demand for railroad Iron has been small so far, and promises to remain so, bears out this view. The furnaces are now nearing the end of their contracts, and are said to be somewhat anxious to market their output. Our quotations are unchanged, but we believe concessions might be obtained. Prices at shipping ports for American Pig are \$26 @ \$27 for No. 1 X; \$24.50 @ \$25.50 for No. 2 X, and \$23 @ \$24 for Gray Forge. Small spot lots command \$2 @ \$3 $\frac{1}{2}$ ton above these quotations. There has been no change in the market for foreign Iron, and sales are very small. Recent cables report the Scotch market firmer, and state that an advance of 1% has taken place. Freights are somewhat easy. We quote Eglinton at \$23.50 @ \$24.50 for moderate-sized lots; Langlois, \$26 @ \$26.50; Gartsherr, \$26; Carnbro, \$25 @ \$26; Glengarnock, \$25 @ \$25.50; Clarence No. 3, \$22.50 @ \$23.50; Shotts, \$26.50. **Old Rails.**—The market is quiet and nominal at \$30.50 @ \$31.50 for American and \$29.50 @ \$30.50 for foreign. **Manufactured Iron.**—Plate and Sheet Iron remain unchanged as to price, but Bar Iron shows a weaker feeling. Nails are in good demand and steady. **Bar Iron.**—The demand for Bar Iron from the stores continues good, though it is almost entirely for small lots and the volume of business only of fair proportions. The market displays a much softer tone, and though our quotations remain unchanged, it is very probable that they will be lower next week. We quote \$2.90 @ \$3 at store for common

grades. Norway and Swedish are scarce and meeting with a fair demand at \$4 @ \$4.25 for Bars, and \$5 @ \$5.25 for Shapes.

Plate Iron.—Prices for Plate Iron have remained the same, and trade is good. We quote Tank at \$3.60; Refined at \$4; Shell at \$4.45; Flange at \$5.45. Tubes are in good demand, and quoted nominally at 37 1/2% from list, but sales are made at 40% off. **Sheet Iron.**—The trade in Sheet Iron has been firm, and there are no changes to note in prices. We quote: Sheet Iron, 4 1/2¢ @ 4 1/2¢; ditto Refined, 5¢ @ 5 1/2¢; Galvanized, 8 1/2¢ @ 11 1/2¢; Russia, 10 1/2¢ @ 11 1/2¢. **Steel.**—Steel is meeting with a fair demand. We quote: Best English Cast, 14¢ @ 15¢; American ditto, 12¢ @ 12 1/2¢; Bessemer Machinery, 5¢ @ 6¢; Wedge and German, 7¢; English Spring and Calking, 7 1/2¢ @ 7 1/2¢; ditto American, 5 1/2¢ @ 6¢; Tire, 4¢ @ 4 1/2¢; Sleigh Shoes, 3 1/2¢ @ 3 1/2¢. **Nails.**—The demand continues good at unchanged prices. We quote \$3.40, net, for 40d. to 60d. **Copper.**—The market is very quiet, and we quote 19 1/2¢ for Ingots, while 19 1/2¢ is asked in some cases for Lake descriptions. A lot of 80,000 lbs of Phoenix, for instance, is offered here at 19 1/2¢, and though 19 1/2¢ might buy the whole quantity, yet that figure was refused for 25,000 lbs. The combination prices of manufactured Copper are unchanged. We quote: Sheathing, 28¢; Braziers, 30¢ @ 32¢; Bolt, 30¢; Copper Bottoms, 31¢ @ 32¢; American Yellow Sheathing Metal, 20¢; Yellow Metal Bolt, 22¢; English Yellow Sheathing Metal, 16¢ in bond. **Lead.**—The market has been very quiet and easier, and quotations are lower. We quote \$5 @ \$5.10, for carload lots and jobbing lots at \$5.20 @ \$5.40. Manufacturers' prices are unchanged. We quote: Bar, 6 1/2¢; Pipe, 7 1/2¢; Sheet, 8¢; Tin-lined Pipe, 15¢; Tin Pipe, 35¢—all less 10%. **Spelter.**—Spelter is quiet, and we continue to quote 5 1/2¢ @ 6¢. Sheet Zinc is quiet at 7 1/2¢ @ 7 1/2¢.

Tin.—The market has shown a firmer feeling, and we quote 25¢. London is quoted at £11.5¢. **Tin Plate.**—The market is quiet, but steady. We quote: Charcoal Bright, \$6.50 @ \$6.75; Terne at \$6 @ \$8; Cokes \$5.50; ditto Terne, \$5.50 @ \$5.75. **Old Iron.**—In a fair request at last quotations, but dealers are willing to sell freely at these prices, and some expect a slight decline in No. 1 Wrought in the near future. Common light Iron sells at about 60¢, and 30 tons of light Iron, with hoops in, have been bought at 65¢. Cotton-bale Hoops do not appear to be selling as well as heretofore, and several consumers who had been buying at 8¢ have now stopped. There is no change in Machinery, but a prime lot of Stove Plate has brought \$55. We quote:

Wrought, No. 1.....	\$1.50 @ \$1.50
" light.....	60 @ 65
Horseshoes.....	1.00
Pipes.....	75 @ 1.00
Hoops.....	90 @ 1.00
Cotton Buckles.....	90 @ 2.75
Car Axles.....	120 @ 1.75
Stove Plate.....	80 @ 85
Machinery.....	1.00
Malleable Iron.....	45 @ 50
Bent Iron.....	30 @ 40
Car Wheels, per ton.....	31.00 @ 32.00
scrap Steel, tool.....	12 @ 15
" file.....	12 @ 15
" Bessemer.....	12 @ 15
Wagon Spring Steel.....	12 @ 15
Car ditto.....	12 @ 15
Turnings, axis.....	8 @ 10
Ditto Machine Shop.....	10 @ 12
Wrought Drillings.....	12 @ 15
Cast Turnings.....	10 @ 12

—Commercial Bulletin.

CINCINNATI.

MARCH 20.—**Pig Iron.**—The business in the past week has been fairly active. Sales have been confined to small lots for immediate consumption. The aggregate shows an increased consumption of all kinds. The prices of the better grades of Charcoal and Coke Iron are firm, but the whole line of lower qualities can be had at a concession on prices two weeks ago. This weakening in the market for these Stove Coal makes has not occurred from any accumulation at furnaces, nor from a falling off in the consumption, but from a disposition on the part of some of the furnace men to speedily realize on their outputs in this and the next month, with a view to putting their furnaces on higher grades by changing the uses of common and low-priced Ores to better grades. It seems as if the outlook on the Iron business in the West, South and Northwest has fixed the minds of both the producers and consumers upon a conservative policy, and the same, it is thought, will govern, without reference to any material changes from present prices. It has been stated within the past two or three days, by what is considered good authority, that orders for manufactured Iron were refused by the rolling mills at prices current a week or ten days ago. Following prices may be quoted as fairly representing a steady market: No. 1 Hanging Rock Charcoal Foundry, \$29.50; No. 1 Coke, \$28 @ \$29; American Scotch, \$29 @ \$29.50; No. 2 @ \$25; Silver Gray Softeners, No. 1, \$25 @ \$25.50; No. 2, \$24 @ \$24.50; No. 3, \$23 @ \$23.50; Hanging Rock Charcoal Forge, \$27; Coke, \$25.50; Bituminous, \$24.50, all four months to come here. Car-wheel Irons are held firm at former quotations. No sales have been heard of from which to make quotations. Scrap, Cast, 60¢ @ 65¢; Wrought, \$1.10 @ \$1.40; Old Car Wheels, \$29 @ \$30; Old Rails, \$28 @ \$30; Bar Iron, \$2.60—card quote for cash as below:

FOUNDRY IRON.

No. 1 Hanging Rock, Charcoal..... \$29.50 @ 30.00

No. 2 Southern, Charcoal and Coke..... 27.50 @ 28.00

No. 2 " " Stonecoal and Coke..... 24.50 @ 26.50

" " American Scotch..... 24.50 @ 25.00

Open Silver Gray..... 24.00 @ 24.50

Close Silver Gray..... 23.00 @ 23.50

MILL IRONS.

No. 1 Charcoal..... 26.00 @ 25.50

No. 2 Stonecoal and Coke, Neutral..... 24.00 @ 24.50

No. 1.	No. 2.
G. M. B., at Glasgow	48. 6
Clothes	58. 6
Langloan	52. 6
Gartsherrie, at Glasgow	57. 6
Smmerries	57. 6
Calder	57. 6
Carnbroe	53. 6
Glenarnock, at Ardrossan	53. 6
Edinburgh	48. 6
Dunmungton	48. 6
Shotts, at Leith	58. 6
Kinledd, at Bo'ness	48. 6
Carren, at Grangemouth	49. 6

John E. Swan & Bros., Limited, quote similar figures to the foregoing, and report a rather dull demand from the United States.

CLEVELAND PIG IRON

is quiet, at the following prices for G. M. B., f. o. b. at makers' wharves in Tees, less the usual 2½% for cash:

No. 1 Foundry	45. 6	Mottled	46. 6
" 2 "	45. 6	White	45. 6
" 3 "	45. 6	Refined Metal	45. 6
" 4 "	45. 6	Kentledge	45. 6
" 5 "	45. 6		

The ironmasters' returns show a decrease in the total stock of 6000 tons during March. Bolckow-Vaughans pay a dividend of 10%, write off £40,000, and carry forward £5000 to next account.

WEST COAST HEMATITES

are dull, despite a large demand, at the subjoined rates for makers' brands.

No. 1.	No. 2.	No. 3.
Cleator	65. 6	65. 6
Lonsdale	65. 6	65. 6
Workington	65. 6	65. 6
West Cumberland	65. 6	65. 6
Lowther	59. 6	58. 6
Moss Bay	59. 6	58. 6
Distington	59. 6	58. 6
Harrington	59. 6	58. 6
Folway	59. 6	58. 6
Maryport	59. 6	58. 6

Merchants are selling parcels of Nos. 1, 2 and 3 at as low as 57.6.

SOUTH WALES AND MONMOUTHSHIRE

are pretty well employed in respect of iron and steel, but the tin plate works are going under disadvantageous conditions, as already stated. With regard to the exports of last month from Bristol Channel ports Mr. Frederick Edwards, Cardiff, sends me the following data: New York—4308 tons of rails, 74,246 boxes of tin plates, 4256 bundles of wire, 8142 tons of blooms, 700 tons crop ends, 446 tons of scrap iron, five barrels and 2000 ingots of tin. Baltimore—500 tons of spiegel and 1500 tons of blooms. New Orleans—2817 tons of rails. Galveston—2249 tons of rails. San Diego—943 tons of rails. Guaymas—849 tons of rails. San Francisco—611 tons of rails. There is still some difficulty in finding a supply of tonnage for your Southern ports, but freights are easier to the Northern ports, for which and for San Francisco there are inquiries for large quantities.

MACHINE-MADE FILES.

The operative file cutters of Sheffield have just taken action in a matter which has long been a subject of heart-burning and contention—namely, that of the relative merits and demerits of machine-made as against hand-cut files. File-cutting machines have been tried by many makers with varying success, but in a general way without sufficiently good results to warrant their use on a large scale. As a matter of fact, two or three concerns specially started to run these appliances have come to grief, and where they are still in operation their products are rarely offered under their true colors. The men allege that machine-cut files are either stamped "hand-made" or are partially cut by the machines and then finished by hand. These practices they now seek to stop, with which aim they have sent round circulars to the manufacturers asking them to return a printed form stating whether they do or do not pursue these means of disposing of files. The makers are scarcely likely to do as they are requested, seeing that from 40 to 50 per cent. of the files sent out of Sheffield are partly or wholly machine made, besides which it is not likely that the makers will consent to be pilloried by advertisements (as suggested) on their own confession. Some fun may, therefore, be expected prior to a settlement being arrived at.

PRICES OF METALS, ETC.

I take the appended list from the current circular of a large house here:

	£	s.	
Lead ore, picked, 1 cwt. kgs.	13	00	
Pig lead	14	00	
Tea lead	19	5	
Antimonial lead	17	00	
Sheet lead	10	00	
Lead pipe	10	00	
" tinned inside	17	10	
Lead encased tin pipe	33	00	
Composition gas tubing	17	10	
Lead wire, to No. 12, 28, 1/2 to 16	37	00	
Hand leads, 24, 12 sea leads	24	00	
Improved lead washers	38	00	
Lead nails	40	00	
Tin	130	00	
Bar lead (3 lbs. and upward)	13	00	
Patent shot	13	00	
Hardened shot	13	00	
Antimony	54	00	
Tin in ingots	115	00	
Tin, bars in 4 cwt. barrels	116	00	
Tin Plates, Coke I. C. per box	116	00	
Charcoal I. C. per box	175	00	
Pumbers' solder	10	00	
Tinman's "	10	00	
Brass solder, per lb	13	00	
Lead, red lead (orig. packages)	Reduced No. 1	13	10
" No. 2	13	10	
" No. 3	14	00	
Glassmakers' red lead	13	00	
Pure English flake litharge 5-cwt. casks	17	5	
Pure English powdered litharge	18	5	
Good foreign flake litharge	17	00	
powdered	17	10	
Pale powder litharge	17	10	
Orange lead, powdered	27	00	
Dry white lead	19	10	
Ground white lead	21	10	
No. 1	19	10	
No. 2	17	10	
Sheet zinc, No. 3 upward	21	00	
" V. M.	22	00	
Zinc, 12 lbs. upward	27	00	
Hard spelter	13	10	
Remelted spelter	16	00	
Anti-friction metals—Babbitt's	£5.15	00	
Taylor's	70	00	
Kingston's	130	00	

THE CHANNEL TUNNEL

is at length beginning to excite some interest here. It has been languidly talked about for years, and has generally been regarded as one of those harmless and utterly impracticable projects which might be safely left to find its own dissolution. Latterly, however, this method of treating the subject has given place to the discussion of pros and cons, questions in Parliament, and more or less heated newspaper writing. Paragraphs have been artfully planted in the daily papers recording this or that fact or theory in connection with the scheme, and every few days

we have been favored with accounts of the actual progress of the borings. Knowing how some of the ropes are pulled in these matters, I have no hesitation in bearing witness to the cleverness with which the tunnel project is being worked. There are two tunnels spoken of and written about, but the one now really before the public is that conceived, promoted and started by Sir Edward Watkin, chairman of the South Eastern Railway Company. Sir Edward is not exactly a Vanderbilt or a Jay Gould, but, minus much of the alleged enormous wealth of those magnates, he is the best imitation Providence has as yet vouchsafed to us poor Britshers. Sir Edward Watkin is not unknown on American soil. He had a turn with the Grand Trunk some time ago, and has, I believe, been mixed up with Erie and the Atlantic and Great Western—as it was then termed. At present he is chairman of the South Eastern Railway Co., the East London Railway Co., the Manchester, Sheffield and Lincolnshire Railway Co., and is, more or less, "connected" with other ventures. He is a shrewd and active man, now getting into years—well into the sixties, I should assume—and is accounted extremely obstinate once he makes up his mind. In some quarters he is deemed a very able administrator, while in others his adroitness is praised at the expense of his ability. As a public man he is open, of course, to criticism in both directions. My own opinion is that he is clever and more versatile than his opponents would have it appear. At all events, the manner in which he (I suppose) is manipulating the "puff preliminary" et hoc genus omne has been magnificent. Every few days he runs a special train to the English end of the tunnel, takes down legislators and other influential personages, lunches them sumptuously and sends them back so many well-primed canvassers for the work he has in hand. In all this he betrays, of course, that full knowledge of the world which is essential to insure success in business. The English heading of the tunnel is cut out of dry chalk, and has now reached a length of some 1000 feet. It is about 8 feet in diameter—but will be a bigger "bore" ultimately—and is being cut by compressed-air machinery, electricity being used for lighting. At the French end works are also in progress. The total length would be about 22 English miles. Nobody doubts the possibility of constructing the tunnel, but there are few who have not serious misgivings as to the possibility of working it regularly and satisfactorily, owing to the great difficulty of efficient ventilation for such a long distance, unless some means can be devised of introducing shafts from above the water line—an improbable matter. The political aspect of the tunnel is that most discussed just now, its enemies urging that to do away with the vaunted insularity of England would be to tempt invasion and to lay us open to dangers from which we are at present wholly exempt. The Government seem to pooh-pooh these alarmist ideas, and do not appear inclined to interfere. Such notions are favored, nevertheless, and there has just appeared a realistic pamphlet giving details of a supposititious French invasion of England, and the occupation of London by the army of that nation!

FOREIGN.

FRANCE.

(Monitor des Intérêts Matériels.)

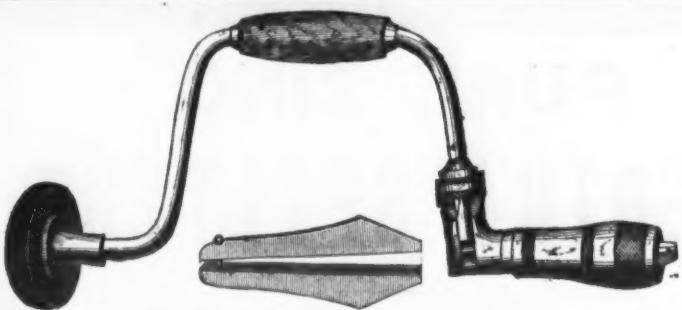
PARIS, March 5, 1882.—Metals.—Business in general has not yet quite recovered from the effects of the panic in January and the many failures resulting from it and then from Metals have been very bad, especially at a slight depression. We quote to-day: Copper, Chili Bars, 165. 00 francs per 100 kg. Ingots and Slabs, 175. 00; Real Selected, 180, and pure Corocore Ore, 170. Tin—Banca, 300; Billiton, 200; Straits and Australian, 207. 50, and English Refined, 203. 75; Lead, 16. 75 to 37. 75, and Spelter, 16. 75 to 24. 00. Iron.—In this city prices have been upheld with great firmness; first-class Merchant Iron, 21 francs per kg.; ditto for flooring at 22. Large Plates, 22 francs per kg.; ditto for beams, 20. In Haute Marne there seems to be no abatement in the demand, causing prices to remain very firm: Coke Merchant at 21. 00 to 21. 50; Mixed, 21; Machine ditto, 22. 00 to 22. 50; Wire Nails No. 13, 29. 00 to 29. 50. In the Longwy district Pie Iron evinces great steadiness at 7.20 francs for puddling, and 8.30 to 8.40 Foundry No. 3 on the ears at the furnaces. During last month 30,000 tons were shipped from there, which is considered a big business. As the first two months of the year, notwithstanding the abatement in general business, development has not been so much activity in the iron and steel trade as any of the fall and winter months preceding them. It is fair to presume that we shall have a good spring season, since the general condition of consumption and demand will go on expanding during the summer season when building is resumed with vigor and this year probably even more so than in 1881, for capital now reveres to more solid enterprises.

STEEL.—In this city prices have been upheld with great firmness; first-class Merchant Iron, 21 francs per kg.; ditto for flooring at 22. Large Plates, 22 francs per kg.; ditto for beams, 20. In Haute Marne there seems to be no abatement in the demand, causing prices to remain very firm: Coke Merchant at 21. 00 to 21. 50; Mixed, 21; Machine ditto, 22. 00 to 22. 50; Wire Nails No. 13, 29. 00 to 29. 50. In the Longwy district Pie Iron evinces great steadiness at 7.20 francs for puddling, and 8.30 to 8.40 Foundry No. 3 on the ears at the furnaces. During last month 30,000 tons were shipped from there, which is considered a big business. As the first two months of the year, notwithstanding the abatement in general business, development has not been so much activity in the iron and steel trade as any of the fall and winter months preceding them. It is fair to presume that we shall have a good spring season, since the general condition of consumption and demand will go on expanding during the summer season when building is resumed with vigor and this year probably even more so than in 1881, for capital now reveres to more solid enterprises.

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No. 10—14-inch Sweep, per dozen... \$33.00 | No. 14—6-inch Sweep, per dozen... \$21.00
No. 11—12-inch Sweep, per dozen... 30.00 | No. 31—12-inch Sweep, per dozen... 39.00
No. 12—10-inch Sweep, per dozen... 27.00 | No. 32—10-inch Sweep, per dozen... 36.00
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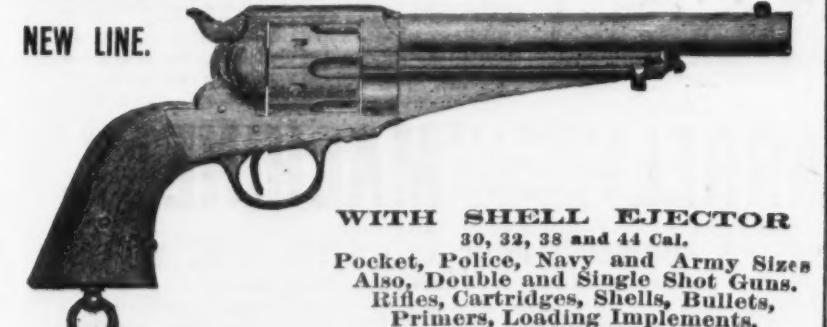
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Patented June 8, 1880.

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DIRECTIONS.—Tack the carpet at one side of the room, then go to the other side, and with the stretcher draw the carpet into place, leaving the spar a few inches from the base-board. Take up the slack in the carpet under the spar and drive the spar gently into the floor; it will hold the carpet in place while you drive the tacks. Manufactured by

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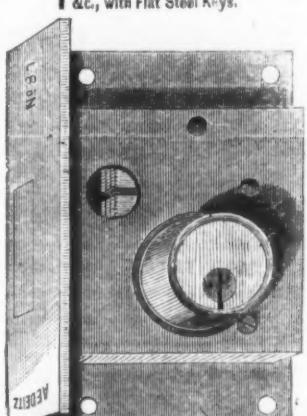
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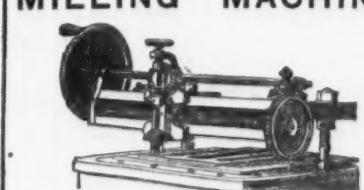
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HOT FORGED AND COLD HAMMERED POINTED, MADE OF BEST NORWAY IRON AND WARRANTED.

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The Winter Wheat Crop.

Returns from the principal agricultural districts lately compiled and tabulated are very satisfactory. The most striking feature exhibited by these reports is the high ratio of condition of winter wheats reported from all the States. Very few counties report a falling off in this particular, although in a few States complaints are made of the Hessian fly, chinch bugs and frost, and in several the only drawback feared is the possibility of frost during the present month. As to acreage, the States of Missouri, Kentucky and Indiana show a large increase over 1881, and Ohio, Illinois and Kansas have made liberal gain in some counties, partly counterbalanced, however, by a loss in others. The three remaining States, Iowa, Minnesota and Wisconsin grow little or no winter wheat, and returns from these were merely obtained for the purpose of ascertaining the present stock of wheat and corn held by growers. But, to notice the facts as to acreage and condition more in detail, of the 34 reports received from Illinois, 10 report an increase of acreage averaging 15 per cent.; 17 a decrease averaging 20 per cent., and 4 an unchanged acreage. Concerning condition, 20 report an improvement over the average, ranging widely from 2 to 100 per cent., but averaging 20 per cent.; while 4 counties report fair condition and 4 a decrease averaging 20 per cent. The replies from Ohio include 27 counties; 13 reporting an average increase in acreage of 12 per cent. and 4 a reduction, averaging 15 per cent. Sixteen counties report an improvement of condition averaging 20 per cent. and 5 a falling off in 13 per cent. Indiana furnishes 21 replies, of which 15 indicate an acreage averaging 15 per cent. larger than last year, 2 a decrease of 20 and 5 per cent. respectively, and the remainder no change. The condition is excellent, none reporting a falling off from the average, and 16 giving an average gain of 23 per cent. In Missouri 46 counties were heard from. In acreage, 25 of these report an increase, rising in individual cases as high as 50 and 60 per cent., but averaging 15 per cent., while 14 show a reduction varying from 5 to 110 per cent., and averaging 30 per cent. The returns of condition, however, are very satisfactory, 34 giving an improvement averaging 23 per cent. and only 3 being of an unfavorable nature. Eleven counties report from Michigan, of which 9 give an increase of acreage averaging 21 per cent. and but one a decrease. The condition in 7 counties was 17 per cent. above the average. Kentucky sends replies from 23 counties, all, with one or two exceptions, being highly favorable. The average increase of acreage in 17 counties was 28 per cent., and the average improvement of condition in 20 counties 39 per cent. There was no decrease of importance in either acreage or condition. From Kansas, returns from 30 counties were received. Of these, 9 report a gain in acreage averaging 18 per cent., and 13 a falling off of 22 per cent. The condition, however, was usually good, 24 counties averaging an improvement of 26 per cent. over the average.

From this summary it will be seen that, on the whole, there is an important increase in the acreage of winter wheat over that of last year, and that the condition of that crop during the last half of February was almost universally much above an average. The result of inquiries as to the percentage of the old crop of wheat and Indian corn still remaining in farmers' hands shows that, of wheat, the proportion left in Michigan and Wisconsin is very small; in Kentucky, Indiana and Minnesota it is moderate, and in Illinois, Iowa and Missouri, large. Of corn, a larger percentage of the crop remains than wheat, the States of Minnesota, Iowa, Illinois and Ohio having each over a third of the crop left, the remaining States also showing a high ratio. The average proportion of the wheat crop in growers' hands, according to these figures, is therefore 23.4 per cent.; and of corn, 30.5 per cent. The following table gives the figures from the different States:

States.	Number of Av. percentage crop reporting			
	Wheat	Corn.	Wheat	Corn.
Illinois	26	25	19	34
Ohio	26	20	23	33
Indiana	19	14	18	34
Missouri	35	32	20	23
Michigan	15	6	24	21
Kentucky	19	14	19	21
Iowa	22	25	27	35
Minnesota	20	15	35	39
Wisconsin	11	6	26	28

As these stocks have to provide for seed and for local consumption for about five months, it will be seen that the stocks are relatively very light. In many localities stocks are entirely exhausted, and local consumption will have to be provided for by purchases from other sources. We infer, from the general tenor of reports, that the supplies both of corn and wheat available for Eastward shipment from this time until next August are likely to prove very limited.

Perhaps one of the best methods ever introduced for tempering steel is that employed in hardening the blades of the famous Damascus swords. The furnace in which the blades are heated is provided with a horizontal slit through which a current of cold air from the outside is allowed to enter. This slit is placed on the north side of the furnace and has an exterior flat funnel-shaped attachment by which the wind is concentrated and conducted into it. The operation of tempering was, as a rule, performed only on those days of winter when a strong north wind prevailed, the red-hot blade being lifted out of the fire and gradually cooled in the current of air issuing from the slit. The proper degree of temper is thus often acquired by a single operation.

Herr Dittmar's method of solidifying petr. deum consists in heating it in a still to 10° with 2 or 3 per cent. of soap. Vinegar is afterwards used to liquefy it. The method and results were unfavorably discussed at a

recent meeting of the Russian Technical Society, St. Petersburg. It was said that the solidification was not perfect, and that oil leaks out of it which would saturate the proposed wood cases for transport and give off vapors; that the cost for soap would be considerable, and that large liquefying works would be required, and finally that the cost of the processes would not be covered by reduction of cost of carriage.

Modera Gunnery.

Within the past few years the attention of artillerists has been directed to the air-spacing of cartridges, as the probable key to the secret of high velocities, and methods have been devised of introducing the air and regulating the quantity with great precision. Colonel Maitland, of the royal gun factories at Woolwich, England, has, however, taken another step in advance by abandoning air spacing as an unprofitable expedient, and trying another system. Having found slow-burning powder best adapted to his requirements, he designed a contrivance for retaining it in the chamber of the gun until sufficiently fired to produce a pressure of about two tons per square inch upon the base of the shot, which then starts with a sudden bound, its speed being accelerated until it leaves the gun. The retention of the shot is accomplished by a ring of metal fixed around it at the base, and so regulated as to size that it will, when placed in the breech, be a trifle larger than the bore through which it has to pass. According to the resistance which it affords will be the period of retention. It has been demonstrated by experiments with field gunpowder that in a very strong vessel the powder may be ignited and converted into gas, but yet held under subjection for an unlimited time. The retention ring is made to surrender at a given pressure, and the requisite conditions for the attainment of maximum velocities thus appear to have been realized. With a 10.4-inch gun a 462 pound shot was fired with a muzzle velocity of 2275 feet per second, the equivalent of which in energy is 16,500 foot-tonnes, but as the powder charge was somewhat in excess of the service allowance, it is fair to reduce this velocity by about 100 feet. It will even then be far in advance of the speed attained under former conditions. The improvement has been shown in a competitive trial between two experimental guns of 45 tons, one being provided with the air-spaced chamber and the other with the retention ring. The former, with 350 lbs. of powder (rather above its service charge), discharged a 700 lb. projectile at a velocity of 1900 feet per second; the latter, loaded with 400 lbs. of powder and a similar shot of 700 lbs., recorded a muzzle velocity of 2120 feet. These figures represent in energy respectively 17,500 and 20,800 tons per foot, and the advantage in an attack upon armor plates may be assessed in the same proportion. The discovery has created great satisfaction in the English government departments, and is expected to lead to still more important results.

A pump-bob, weighing 16 tons, was recently received at the Comstock mines. It will carry, when in place, 30 tons as a counter-balance to the pump-rod. The combined weight of the balance in the seven bobs at the Union shaft is 210 tons. The weight of the pump-rod and water set in motion by every stroke of the engine is something over 40 tons, run at a speed of from three to ten strokes per minute. Four hundred tons per stroke, 2800 tons per minute, 165,000 per hour, and 4,032,000 tons every twenty-four hours, is the weight moved by the pumping engine at the Union shaft.

The death of Maurice Healy, some months ago, at the hands of suspected Mollie Maguire in the Pennsylvania iron regions, was marked by circumstances of peculiar atrociousness. While peacefully walking the streets he was approached from behind by several persons and instantly shot dead, without provocation. Pat Dolan was convicted of murder, and five others held for trial, but on the 14th inst. all the latter were unceremoniously released, the Commonwealth not thinking the evidence sufficient to hold them. We doubt whether the majesty of the law is fully vindicated in this termination.

The exhibits at the electric exhibition at the Crystal Palace, London, are rapidly assuming order, and nearly all the leading competing firms have their respective displays into more or less complete practical operation. The exhibition will be a most interesting one, and will have a much more fascinating influence on the general public than the woolen exhibition which closed a few months ago at the Crystal Palace.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,
Issue License to use the Process for the
Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of The Iron Age of Oct. 26th, 1877.

H.B. SMITH MACHINE CO.
925 MARKET ST.
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CELEBRATED

WOOD WORKING
MACHINERY

For Car Shops, Planing Mills, &c.

Also Machinery for all purposes. Correspond with us.

The Schoenberg Metal Mfg. Co.,
Manufacturers of

LEAD PIPE,
SOLDER, TYPE,

STEREOTYPE, ELECTROTYPE, AND BABBITT METALS.
Importers of Block Tin, Antimony, &c. Refiners of
Lead, Steel, &c. Highest price paid for old Metal,
and articles of Metal. 325 & 330 East 20th
and 345 & 327 E. 19th Streets, between Avenues
A and B, New York.

Herr Dittmar's method of solidifying petr. deum consists in heating it in a still to 10° with 2 or 3 per cent. of soap. Vinegar is afterwards used to liquefy it. The method and results were unfavorably discussed at a

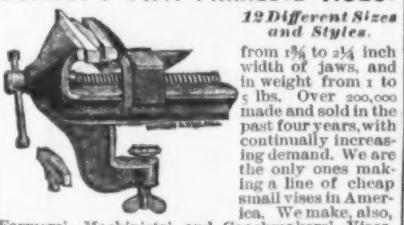
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Buffing and Polishing Lathes, Shafting, Counter-shafting, Pulleys, Hangers and Couplings, Lubricators, Oil Cups, Brass, Tin and Malleable Iron Oilers, Engineers' Oil Sets.

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12 Different Sizes
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from 1/2 to 2 1/4 inch
width of jaws, and
in weight from 1 to
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sales. They are the
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line of cheap
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Chestnut St., Philadelphia, Pa.

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PURE ZINC

BERTHA SPELTER.

BERTHA SPELTER CERTIFICATE OF ANALYSIS.

DEAR SIRS:—

The sample of Spelter marked "Bertha Zinc," submitted to me for examination, contains

IRON, - - - - - 0.0371 per cent.
ZINC, - - - - - 99.9629 " "
TOTAL, - - - - - 100.0000 " "

Lead, Copper, Cadmium, Manganese, Arsenic, Antimony and Sulphur, were carefully tested for, but with negative results, it being impossible to obtain weighable quantities, although a large proportion of the Spelter was taken for the Analysis.

Very Respectfully,

P. DE P. RICKETTS, E. M. PH., D.,
Assayer and Chemist, cor. 50th St. and Fourth Ave., New York City.

The following letter from the Purchasing Agent of Pennsylvania Railroad explains itself.

THE BERTHA ZINC MINING AND SMELTING CO.:

GENTLEMEN:—

Our chemist has examined the sample of zinc you recently left at Altoona, and pronounces it a very pure article. When you are prepared to put it on the market I will be glad to have you advise me with price.

Yours truly,

ENOCH LEWIS, Pur. Agt.

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MERCHANT & CO.,

AGENTS FOR MANUFACTURERS,

525 Arch Street, PHILADELPHIA, PA.

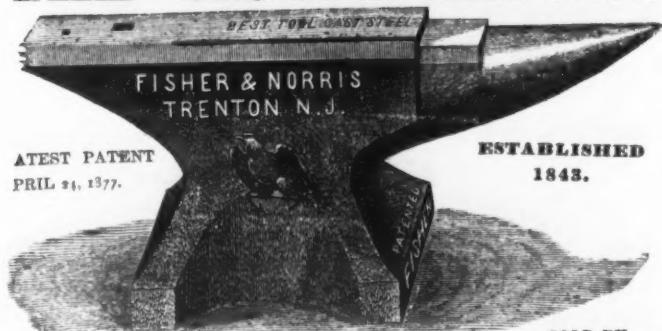


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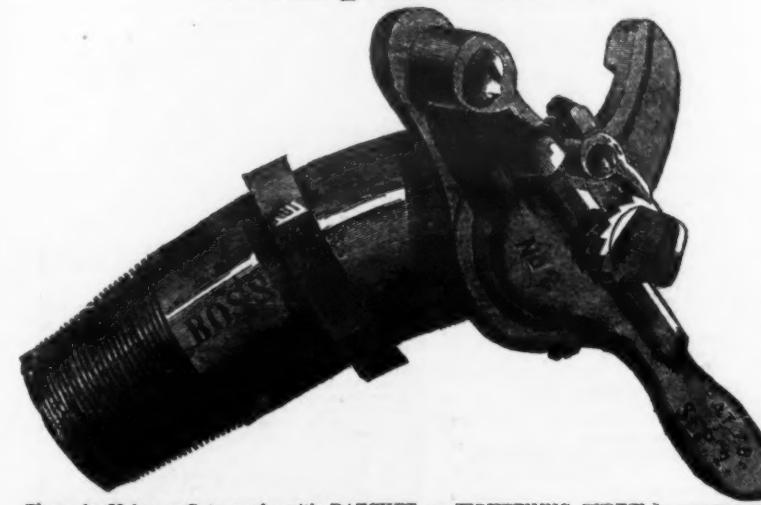
WARRANTED!!

Better than the Best English Anvil.

Face in one piece, of BEST TOOL CAST STEEL, PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

N. B.—That the "Eagle" Anvil is the **only** one made at Trenton, New Jersey, and it must not be mistaken for an Anvil in the market called Trenton, but which is really of foreign manufacture, and an imported imitation of the English Anvil.

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The only Molasses Gate made with RATCHET on TIGHTENING SCREW, to secure a regular pressure, and hold it securely so as to prevent leaking.

ALSO,

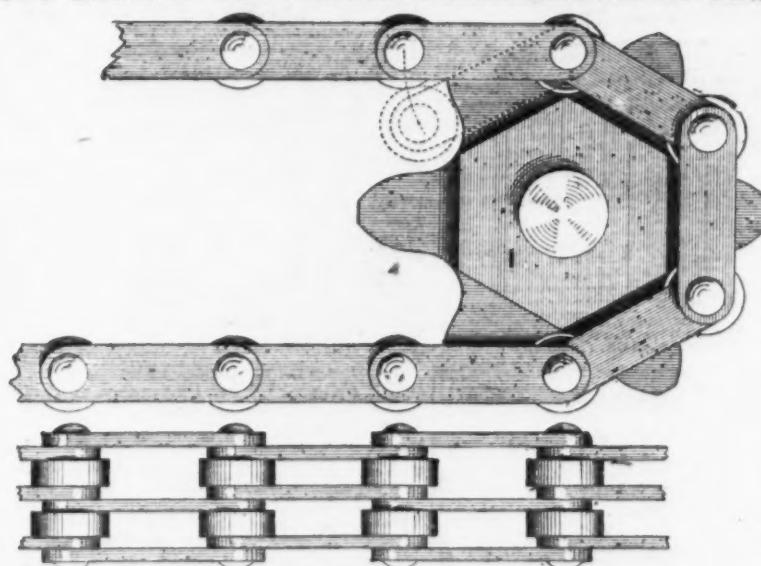
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Lockwood's Solid Cast-Steel Hoes,
Kieser's Double Shear Cut Meat Cutters.
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The Lechner Anti-Friction Detachable Roller Chain.



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ARE MADE BY
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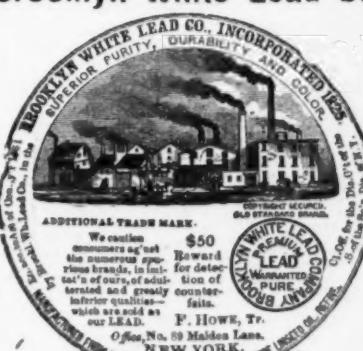
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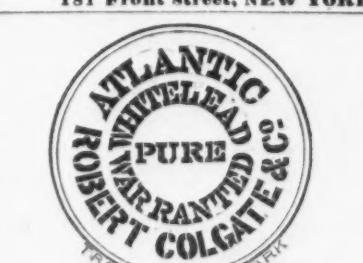


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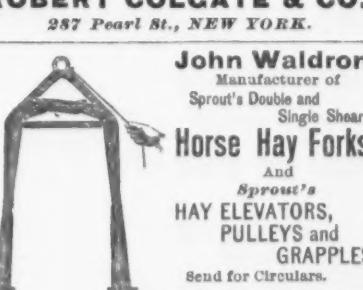


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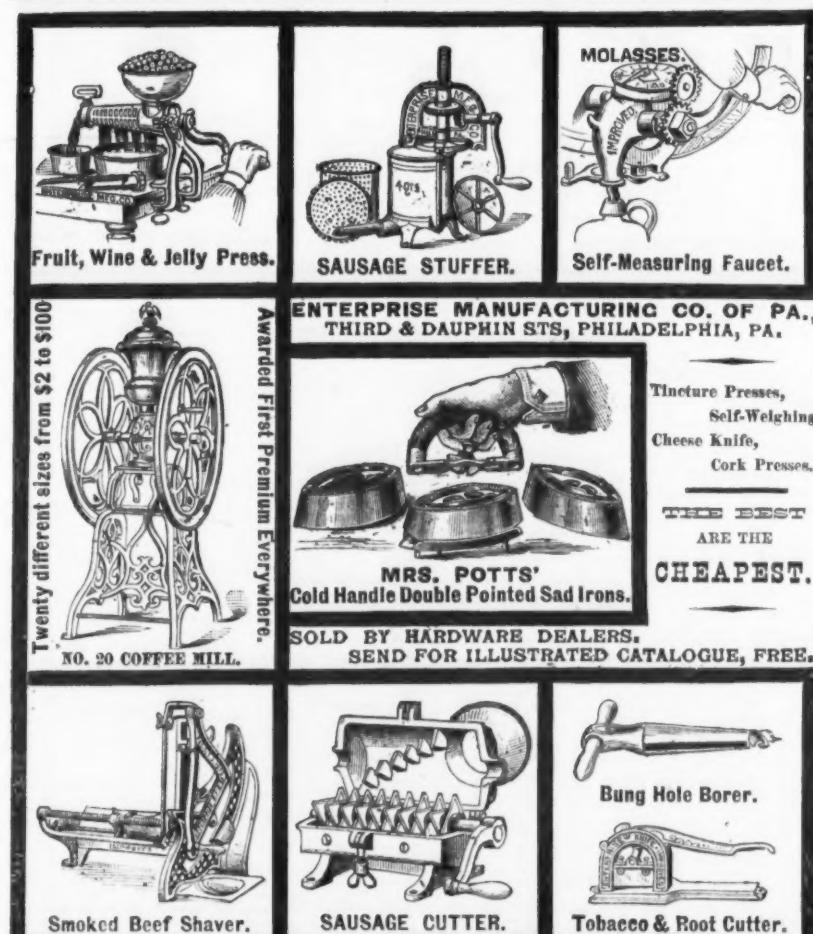
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BOSS AND CROWN SPRINGS, For light doors,
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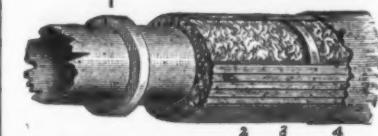
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The BEST DOOR SPRING in the MARKET.

It will hold a door open as well as shut, and by its peculiar form has four inches more leverage to hold a door shut, closing it tight, where all other Springs fail. No latch required with this Spring.

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Correspondence solicited with jobbers and large dealers. We will send a full-size Spring or a small model free, on application. Try it.



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Only double Ring ever invented. The only Ring that will effectively hold a door from rooting. No sharp points in the nose.

Ringers 750. Rings, etc. 100.

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Only single Ring in

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Scand. Pad Locks With Flat Keys.

Shackel secured to the Lock Box.

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New York Wholesale Prices, March 22, 1882.

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Alvils, Eagle Anvils, American.	\$100.00	100 lbs 20¢
Wright's.	100¢	100¢
Armitage's Mouse Hole.	90¢	90¢
Trenton.	10¢	10¢
Wilkinson's.		

Anvil Vice and Drill.

Miller's Falls Co.	\$28.00	
		dis. 20%
Angers and Bits.		
Conn. Valley Mfg. Co.		
Douglas Mfg. Co.		
Humphreysville Mfg. Co.		
Ives.		
Beecher (French, Swift & Co.).		
Griffiths Mfg. Co.		
Watrous & Co. Extension Lip.		
Cook's Douglass Mfg. Co.		
Lewis' Patent Single Twist.		
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand Rail Bits.		
Brown's Auger.		
Musell Jennings' Car and Machine Bits, Forging Machine and Millwright's Augers.		
Imitation Jennings' Bits.		
Snell Mfg. Co. & Jennings' Bits.		
Andrews' Bits.		
Expansive Bits, Clark's, small, \$18; large, \$26, dis. 25%.		
Expansive Bits, Ives.		
Expansive Bits, Parmelee's.		
Expansive Bits, Derby, \$17 and \$26.		
Hollow Augers, Ives'.		
Hollow Augers, Douglass'.		
Hollow Augers, Bonney's Adjust.		
Hollow Augers, Stearns' Adjust.		
Hollow Augers, Douglass' Adjust.		
Hollow Augers, Douglass' Universal Expan.		
Wood's.		
Simler's Bits.		
Simler's Bits, Diamond.		
Simler's Bits, Bee'.		
Double Cut Gimlet Bits, Shepardson's.		
Double Cut Gimlet Bits, Ct. Valley Mfg. Co.		
Double Cut Gimlet Bits, Hartwell's.		
Double Cut Gimlet Bits, Ives'.		
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Homedieu's Ship Augers.		

Awl Hats.

ewing, Brass, Ferrule.	\$3.00	10¢ gross
ewing, Sewing, Short.	\$1.00	10¢ gross
ewing, Sewing, Short.	\$1.00	10¢ gross
steel Peg, Plain Top.	\$10.00	10¢ gross
steel Peg, Leather Top.	\$12.00	10¢ gross

Awls, Brad Sets, &c.

awl, Sewing, Common.		10¢ gross \$1.70; 10¢ doz.
awl, Shouldered Peg.		10¢ gross \$2.45; 10¢ doz.
awl, Patent Peg.		10¢ gross \$2.45; 10¢ doz.
awl, Souther's Brad.		10¢ gross \$2.45; 10¢ doz.
awl, Handled Handle.		10¢ gross \$2.45; 10¢ doz.
awl, Handled Scratch.		10¢ gross \$2.45; 10¢ doz.
awl, Socket Scratch.		10¢ gross \$2.45; 10¢ doz.
awl, Star.		10¢ gross \$2.45; 10¢ doz.
Sprague, No. 1, \$2.00; No. 2, \$2.25; No. 3, \$2.50.		
"World's Best" 10¢ gross.		
Brad Sets, Stanley's Excelsior, No. 1, \$6.00, dis. 20%.		
Brad Sets, Stanley's Excelsior, No. 2, \$8.00, dis. 20%.		
Brad Sets, Stanley's Excelsior, No. 3, \$10.00, dis. 20%.		

Axes.

Fraser's.		10¢ doz.
Axes.		
Standard list.		dis. 40%
Bag Holders.		dis. 40%
B'springle's Patent, per doz \$18.		dis. 40%

Balances.

All Spring Balances.		dis. 10¢ to 10%
Bells.		
Hand, Light Brass.		dis. 5¢ to 10¢
Hand, White Metal.		dis. 5¢ to 10¢
Hand, Silver Chime.		dis. 10¢ to 10¢
Hand, Globe (Cone's Patent).		dis. 10¢ to 10¢
Gong, Abbe's.		dis. 10¢ to 10¢
Gong, Hartwell's.		dis. 10¢ to 10¢
Gong, Hartson's.		dis. 10¢ to 10¢
Crank, Taylor's.		dis. 10¢ to 10¢
Crank, Brooks'.		dis. 10¢ to 10¢
Crank, Connel's.		dis. 10¢ to 10¢
Lever, Sargent's.		dis. 10¢ to 10¢
Lever, Taylor's Bronzed or Plated.		dis. 10¢ to 10¢
Lever, R. & E. M. Co.'s.		dis. 10¢ to 10¢
Lever, Read'ng.		dis. 10¢ to 10¢
Pull, Brooks'.		dis. 10¢ to 10¢
Pull, Western.		dis. 10¢ to 10¢
Cow, Cowson Wrought.		dis. 10¢ to 10¢
Cow, Western.		dis. 10¢ to 10¢
Cow, Western, Sargent's new list.		dis. 10¢ to 10¢
Cow, Western, "Star."		dis. 10¢ to 10¢
Cow, Texas "Star".		dis. 10¢ to 10¢

Bellows.

Blacksmiths' Common.		dis. 45¢
Blacksmiths' Extra Pittal urgh Pattern.		dis. 45¢
Hand Bellows.		dis. 25¢
Bellting, Rubber.		
N. Y. Bellting and Packing Co.		dis. 50¢ to 5%

Bit Holders.

Extension, Barber's.		per doz. \$1.00--dis. 10¢
Extension, Ives'.		per doz. \$1.00--dis. 10¢
Augular.		per doz. \$2.00--dis. 40¢
Augular.		per doz. \$2.00--dis. 40¢
Blind Adjusters.—Domestic.		per doz. \$3.00--dis. 15%
Excelsior.		per doz. \$6.00--dis. 5¢ to 10%

Blind Fasteners.

MacKrell's.		per pairs, \$1.00, dis. 10%
Van Sand's, Screw pattern.		10¢ gross, net
Van Sand's, old pattern.		10¢ gross, net
Washburn's Patent.		10¢ gross, net
Washburn's Patent.		new list net
MacKrell's.		per pairs, \$0.65, dis. 10%

Bind Staples.

Bent.		per in. and larger.
awl, Shouldered Peg.		10¢ gross net
awl, Patent Peg.		10¢ gross net
awl, Souther's Brad.		10¢ gross net
awl, Handled Handle.		10¢ gross net

Boats.

New List Jan. 4, 1882.		
Penfield Block Co., 10¢ per pair and from Straps'd.		dis. 35%
Penfield Block Co., Wrot, Iron Com. bush'd.		dis. 20%
Penfield Block Co., Wrot, Iron, all steel roll'r.		dis. 20%
Penfield Block Co., Lic. and Iron Sheaves.		dis. 35%
Stanley Rule and Level Co.'s.		dis. 10%

Bolts.

Cast Iron Chain, Sargent's list.		dis. 10¢ to 10%
Cast Iron Chain, Wrot, Sargent's.		dis. 10¢ to 10%
Plain Bibb's new list, July 1, 1882.		dis. 10¢ to 10%
Plain Bibb's new list, July 1, 1882.		dis. 10¢ to 10%
Wrought Square.		dis. 10¢ to 10%
Wrought Square, all Iron, Stanley's list.		dis. 10¢ to 10%
Wrought Shutter, Brass Knob, Stanley's list.		dis. 10¢ to 10%
Wrought Shutter, Sarz's list.		dis. 10¢ to 10%
Wrought Shutter, Sarz's list.		dis. 10¢ to 10%
Wrought Shutter, Brass Knob, Stanley's list.		dis. 10¢ to 10%
Wrought Shutter, Sarz's list.		dis. 10¢ to 10%
Wrought Shutter, Sarz's list.		

Razor Straps.	dis 6c @ 6c
Genuine Emerson.	dis 10c
Badger's not Emerson.	dis 12c
Hodger's not Emerson.	dis 10c
Evans'.	dis 40c
Imitation Emerson.	dis 10c
Hunt's.	dis 20c
Chapman.	dis 10c
Saunders'.	dis 20c
Torre's.	dis 10c
Rivets.	
Iron and Tinmed, new list, Dec. 10, 1881.	dis 40c
In bulk, new list, Dec. 10, 1881.	dis 35c
Copper, Tinmed and Brass.	dis 40c
Nos. 7, 10, 11, 12, 13, 14, 15, 16, 17.	dis 40c
W. B. 400 500 520 540 560 580 600 620 700 800 900.	dis 40c
Rivet Sets.	dis
Rods.	
Stair, Brass.	dis 2c
Stair, Black Walnut.	dis 2c
Stair, American Patent.	dis 2c
Rollers.	
Barn Door, Sargent's list.	dis 6c & 10c
Acme (Anti-Friction).	dis 6c
Ho.	
Man Lit Li. Oct. 5, 1881, dis on 1000 ft. and over.	15c per ft.
Manila.	3c inch and larger 3c per ft.
Manila.	3c inch and larger 3c per ft.
Manila.	3c inch and larger 3c per ft.
Manila, Tard Lath Yarn.	3c per ft.
Manila, Hay Rope.	3c per ft.
Sisal.	3c inch and larger 3c per ft.
Sisal.	3c inch and larger 3c per ft.
Sisal, Hay Rope.	3c per ft.
Rules.	
Boxwood. Ivory.	
Chapin's.	{ dis 60c & 10c
Standard.	{ dis 55c & 10c
Standard.	dis 55c & 10c
Standard.	dis 55c & 10c
Sad Irons.	
From 1 to 10 lb.	W. B. 3c net
Self-Heating.	W. B. 3c net
Self-Heating Tailors.	W. B. 3c net
Gleason's Steel and Toilet.	W. B. 3c net
Mr. & Mrs. Iron. Double Pointed.	W. B. 3c net
Miss Port's Iron. Square Back.	W. B. 3c net
Enterprise Star Irons.	W. B. 3c net
Proteus Irons.	W. B. 3c net
New England, same list as B. & A. Flint.	W. B. 3c net
Gage's.	W. B. 3c net
Sash Cord.	
Common.	W. B. 15c net
Patent.	W. B. 20c net
Silver.	W. B. 20c net
Silver Lake, White Cotton.	W. B. 50c, dis 10c
Silver Lake, Drab Cotton.	W. B. 50c, dis 10c
Raw Hide.	W. B. 50c, dis 10c
Steel Ribbon.	W. B. 50c, dis 10c
Sash Locks.	
Clark's, No. 1, \$10.00; No. 2, \$12.00 per gross.	dis 33c & 5c
Forger's Patent.	dis 33c & 5c
Walker's.	dis 33c & 5c
Hammond's Window Springs.	dis 25c
Northup Window Springs, No. 1, \$1000 W. gross.	dis 15c
The Perfect, Clark & Smith, \$1000 W. gross.	dis 15c
The Perfect, Clark & Smith, K. W. Jap. 10c gross.	dis 15c
The Perfect, Clark & Smith, N. Plated.	W. gross 37.00 net
"Universal."	dis 30c
Sash Weights.	
Solid Eyes, in 50 lb. lots and over.	W. B. 15c net
Sausage Stuffers or Fillers.	
Miles.	W. B. 20c net
Porter's.	W. B. 20c net
Straw Cut No. 4.	each \$1.00, dis 20c
Enterprise Mfg. Co.	dis 25c
Silver's.	dis 25c
Saws.	
Dayton's Circular.	dis 40c
Dayton's Mill.	dis 40c
Dayton's Cross Cut.	dis 40c
Dayton's Hand, Panel, Rip, &c.	dis 20c
Boynton's Lightning Circular, new list.	dis 20c
Boynton's Circular, lengths, new list.	dis 25c
Boynton's Bullet Webs, 30 inch, new list.	dis 25c
Boynton's Lightning Buck Saws X Bar.	dis 25c
Boynton's Lightning Hand, Panel and Rip.	dis 25c
W. M. & C. Mfg. Co. Circular Hand.	dis 20c
Livingston's Butcher and Kitchen.	dis 20c
Livingston's Framed Wood—	dis 20c
Perdon.	W. B. 10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c, 90c, 100c
Saw Frames.	
Whitney's.	W. B. 10c, dis 10c
Red, Polished and Varnished.	W. B. 10c, dis 10c
Raw Rods.	W. B. 10c, dis 10c
Saw Sets.	
Boynton's Patent X Cut, per doz, \$12.00; Hand Saw per doz, \$10.00.	dis 10c
Stillman's Patent.	W. B. 10c, dis 10c
Stillman's Imitation.	W. B. 10c, dis 10c
Common Lever.	W. B. 10c, dis 10c
Leach's.	W. B. 10c, dis 10c
Nash's.	W. B. 10c, dis 10c
Hammer, Hotchkiss.	W. B. 10c, dis 10c
Bemis & Call Co.'s new Patent.	W. B. 10c, dis 10c
Hammer, Bemis & Call Co.'s Lever & Spring Hammer.	W. B. 10c, dis 10c
Bemis & Call Co.'s Cross Cut.	W. B. 10c, dis 10c
Aiken's Genuine.	W. B. 10c, dis 10c
Aiken's Imitation.	W. B. 10c, dis 10c
Hart's Patent Lever.	W. B. 10c, dis 10c
Diese's.	W. B. 10c, dis 10c
Morrill's.	W. B. 10c, dis 10c
Scrapers.	
Adjustable Box Scraper (S. R. & L. Co.).	W. B. 10c, dis 20c & 10c
Box, 1 Hand.	W. B. 10c, dis 20c & 10c
Box, 2 Hand.	W. B. 10c, dis 20c & 10c
Double Box and Ship.	W. B. 10c, dis 20c & 10c
Foot.	W. B. 10c, dis 20c & 10c
Ship, common.	W. B. 10c, dis 20c & 10c
Ship, Providence Tool Co.	W. B. 10c, dis 20c & 10c
Screen Cutters.	
Porter's Pat. Window and Door Frame.	dis 33c
Sewer Drivers.	
Douglas Mfg. Co.	dis 50c & 10c
Douston's.	dis 40c & 10c
Douston's Patent Excavator.	dis 40c & 10c
Buck Bros.	dis 40c & 10c
Stanley Rule & Level Co.'s, Varnished Handles.	dis 50c & 10c
Stanley Rule & Level Co.'s, Black Handles.	dis 40c & 10c
Sargent & Co.'s.	dis 40c & 10c
Gay's Double Action.	dis 40c & 10c
W. B. 10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c, 90c, 100c.	dis 40c & 10c
Mallett & Co.'s Double Action Clutch	dis 40c & 10c
W. B. 10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c, 90c, 100c.	dis 40c & 10c
W. B. 10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c, 90c, 100c.	dis 40c & 10c
W. B. 10c, 20c, 30c, 40c, 50c, 60c, 70c, 80c, 90c, 100c.	dis 40c & 10c
Clark's Patent.	dis 40c & 10c
Screws.	
Flat Head Iron.	New list April 1881.
Flat Head Iron.	W. B. 10c, dis 10c
Flat Head Brass.	New list April 27, 1881.
Round Head Brass.	New list April 27, 1881.
Brass and Steel Capped.	dis 20c
Japan's list of Plain Screws.	dis 20c
Coach, Patent Gimlet Point.	dis 20c
Coach, Common or Lag.	dis 20c
Bed.	dis 20c
Machine, Plain Head, Iron.	dis 20c
Machine, Round Head, Iron.	dis 20c
Bench, Iron.	dis 20c
Bench, Wood, Beech.	W. B. 20c
Bench, Wood, Hickory.	W. B. 20c
Hand Rail, Sargent's.	dis 20c
Hand Rail, Humason, Beckley & Co's.	dis 45c
Hand Rail, Am. Screw Co., list of Jan. 1, '81.	dis 70c
Jack (W. B. 10c's).	dis 25c
Window Balances.	
W. B. Auguine's.	dis 20c & 10c
Serg's.	dis 20c
Lester, \$10.00.	dis 25c
Rogers, \$3.00.	dis 25c
Shears and Scissors.	
American (Cast) Iron.	dis 70c
Pruning.	see Pruning Hooks and Shears
Barnard's Lamp Trimmers.	W. B. 35c
Timber.	dis 20c
Seymour's List, Dec. 1881.	dis 20c
Heitach's List, Dec. 1881.	dis 20c
Helmach's Tailor's Scissors.	dis 33c & 5c
Mass. Cutlery Co. St. Trimmers.	dis 75c
Shears.	
Sliding Door, M. W. & Co. list.	dis 40c & 25c
Sliding Door, R. & E. list.	dis 40c & 25c
Sliding Door, Patent Roller.	dis 40c & 25c
Sliding Door, Patent, H. H. H. list.	dis 40c & 25c
Sliding Door, Russell's Anti-Friction.	dis 40c & 25c
Sliding Door, Moore's Anti-Friction.	dis 40c & 25c
Sliding Shutter, R. & E. list.	dis 40c & 25c
Sliding Shutter, R. & E. list.	dis 40c & 25c
Moore's Anti-Friction (Hanging).	dis 40c & 25c
Shovels and Spades.	
Ames, New list, July 1, 1881.	dis 10c
Griffiths.	dis 10c
Oil Company.	dis 10c
Payne Pat. & Son, new list.	dis 40c & 10c
Payne Pettebone & Son, R. R. Shovels.	dis 15c
Reumington's (Lowman's Patent).	dis 10c
Rowe's.	dis 10c
Shovels and Spades.	Iron and Brass Head, R. & E. list.
Polished Steel, new list.	dis 50c & 10c

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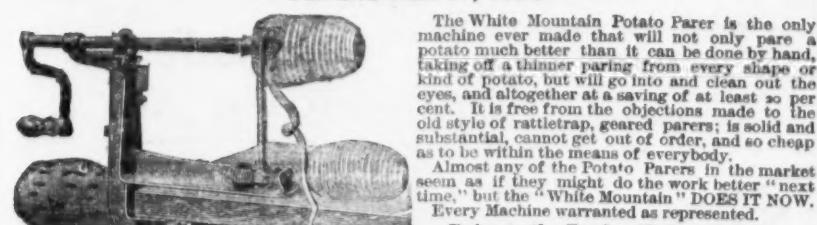
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Almost any kind of Potato Parer in the market seems, as if they might, do the work better "next time," but the "White Mountain" DOES IT NOW. Every Machine warranted as represented.

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HAND OR POWER.

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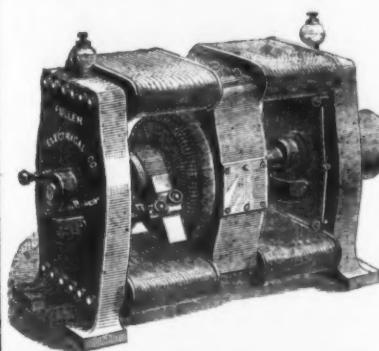
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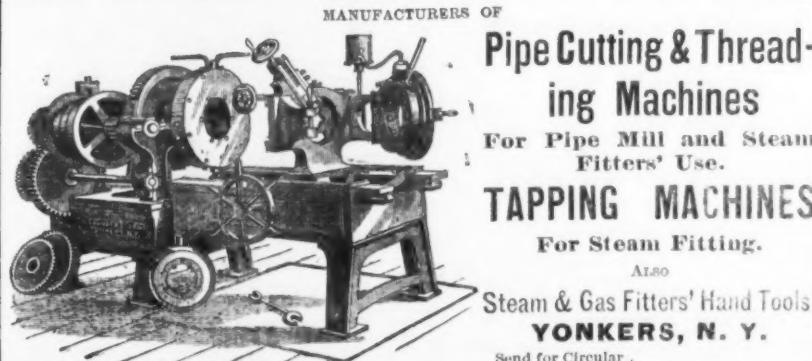
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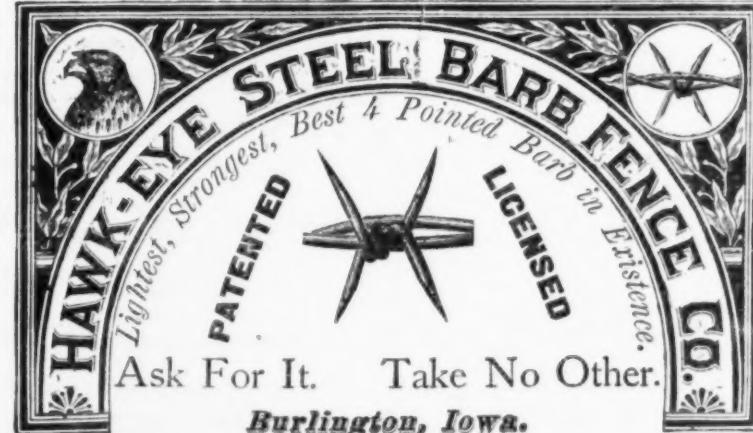
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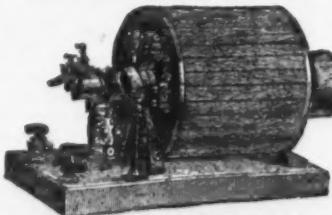
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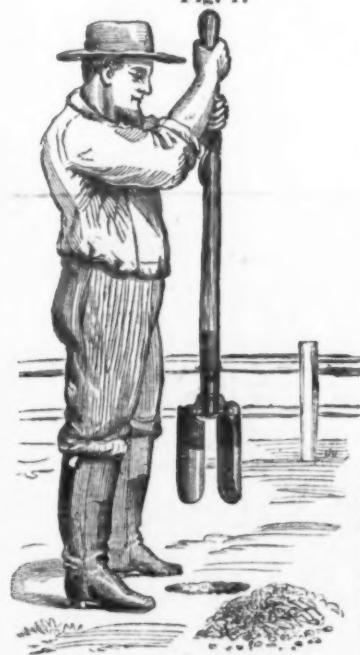
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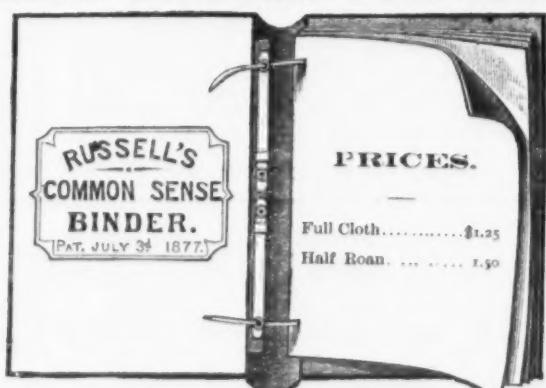
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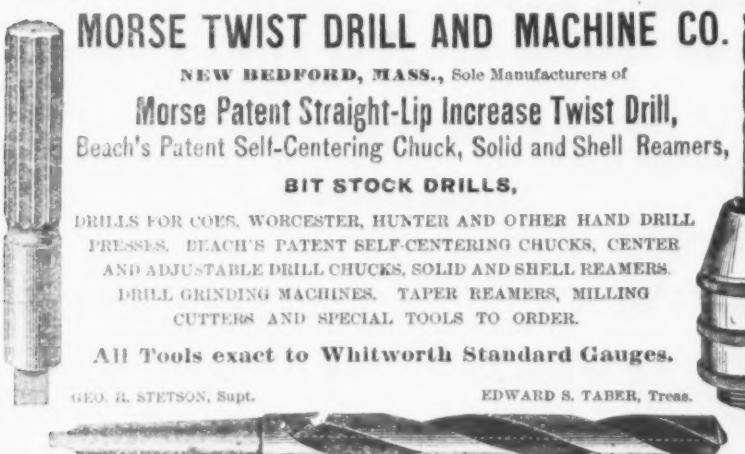
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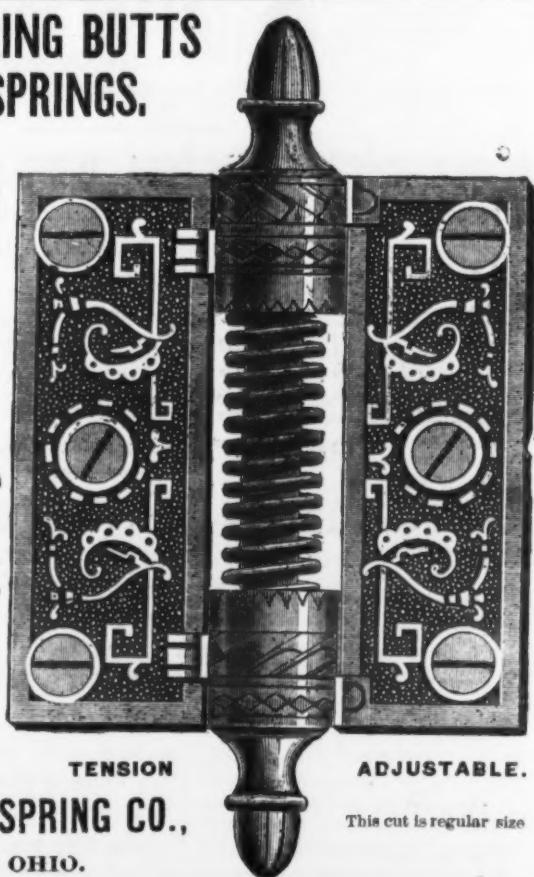
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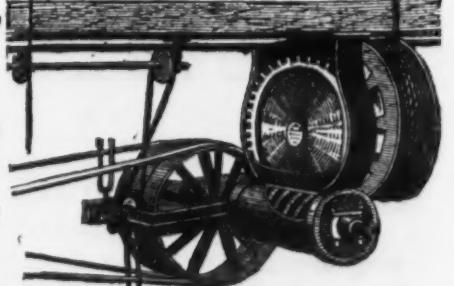
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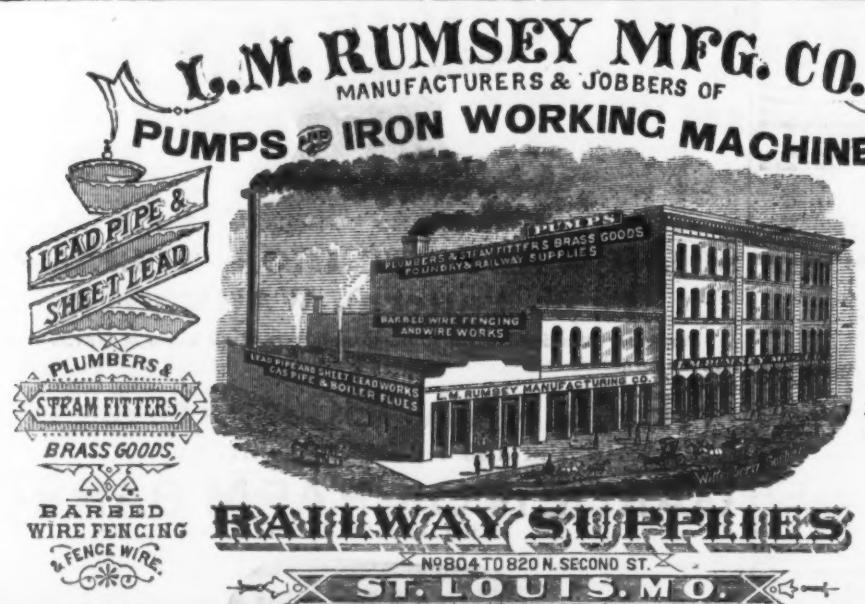
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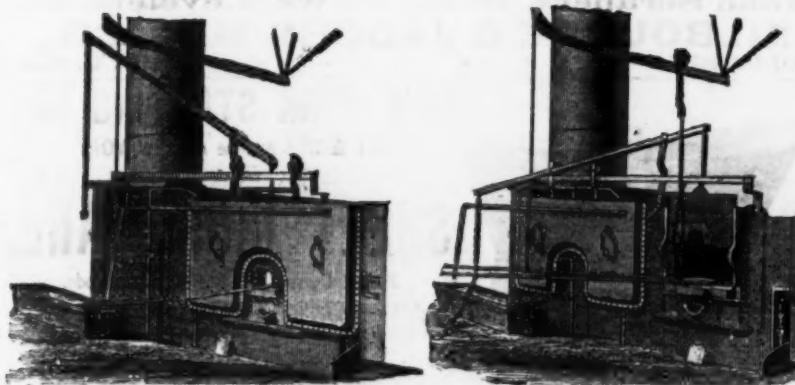
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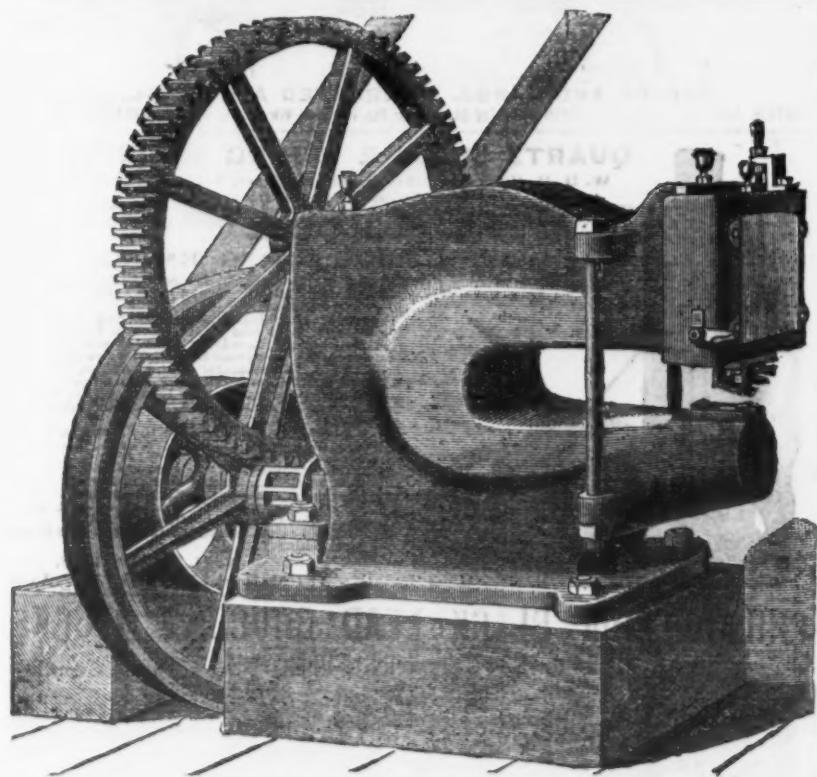
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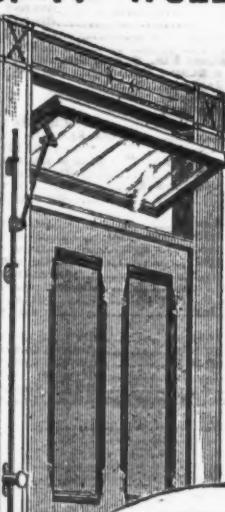
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Bells—Connel's Crane Gong, reduced list dia 10 to 5

Bird Cases—. dia 15 to 20

Japanned M. B. & D., reduced list, 1879. dia 45

Brass M. B. & D., reduced list. dia 35 to 5

Brass M. B. & D., reduced list. dia 30 to 5

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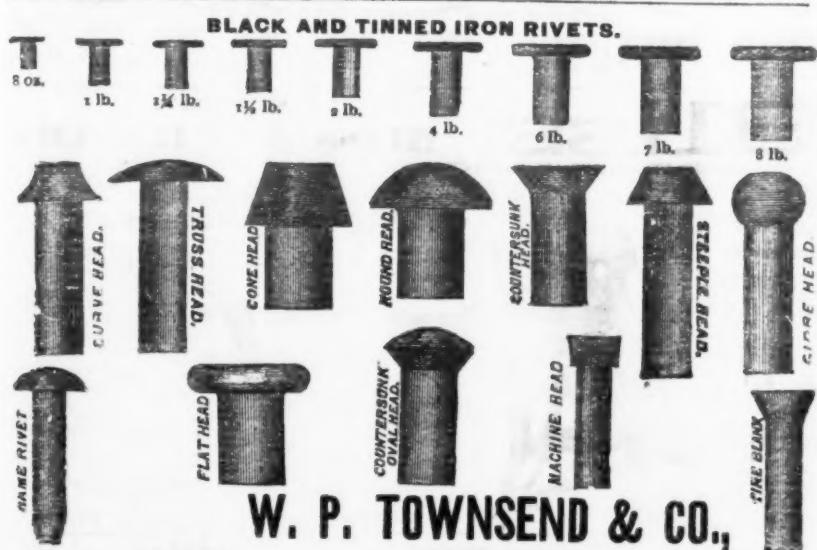
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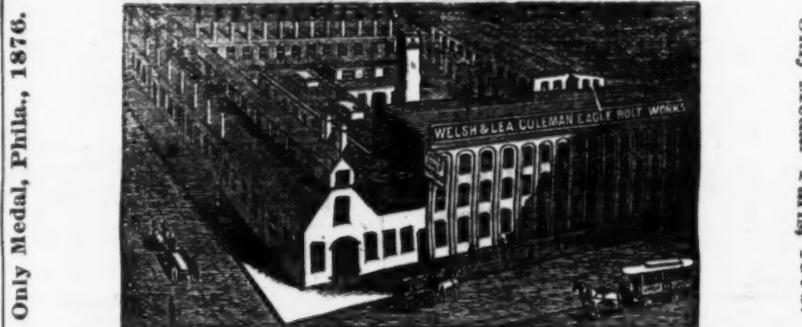
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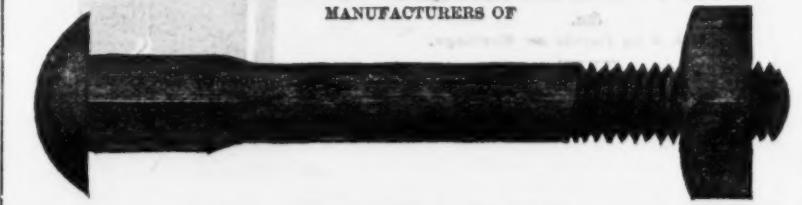
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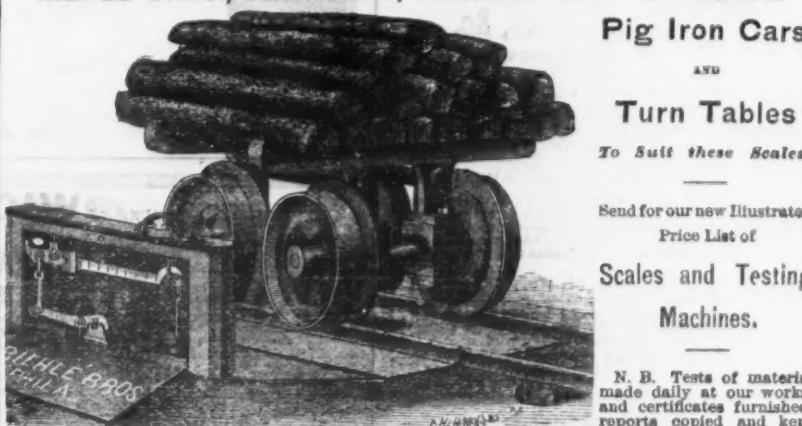


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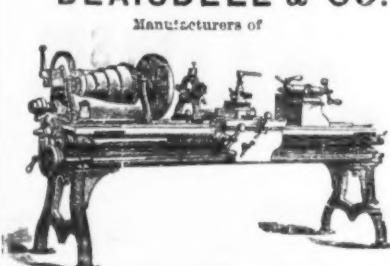
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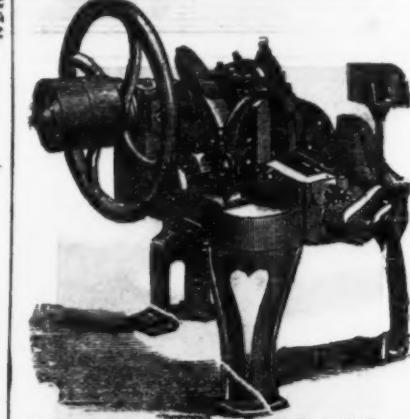
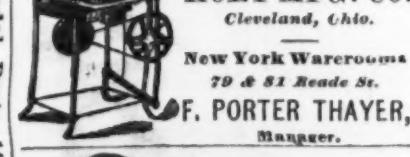
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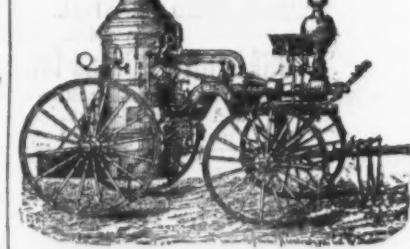
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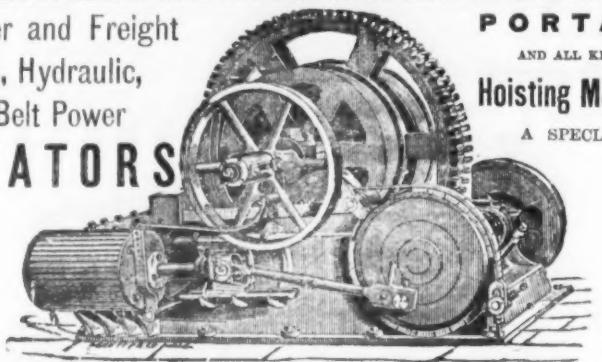
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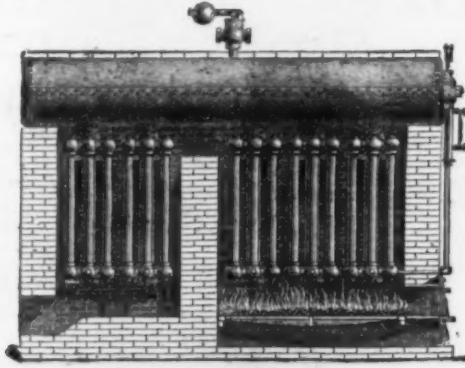
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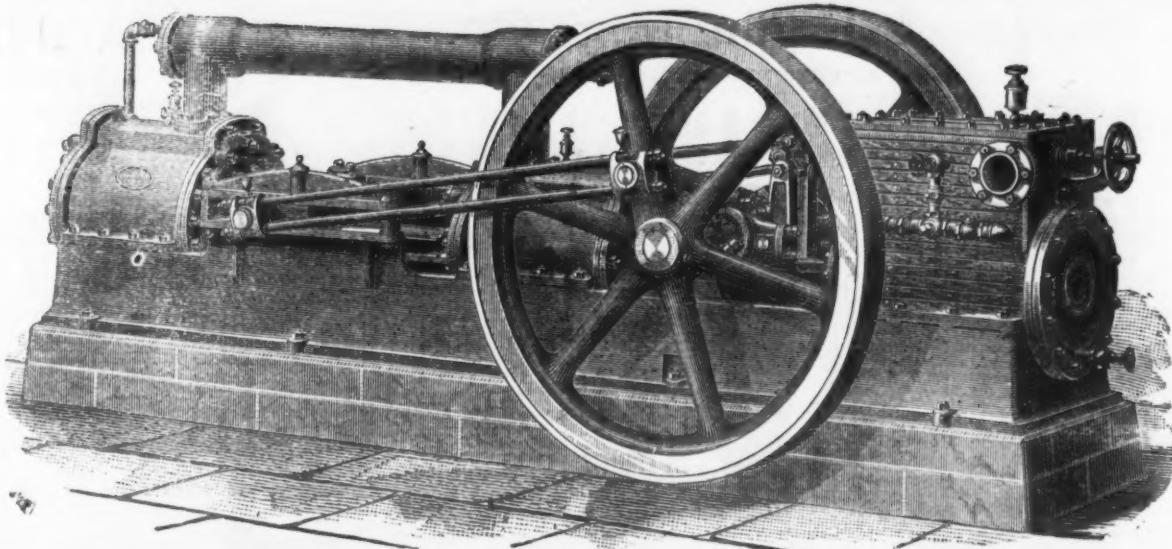
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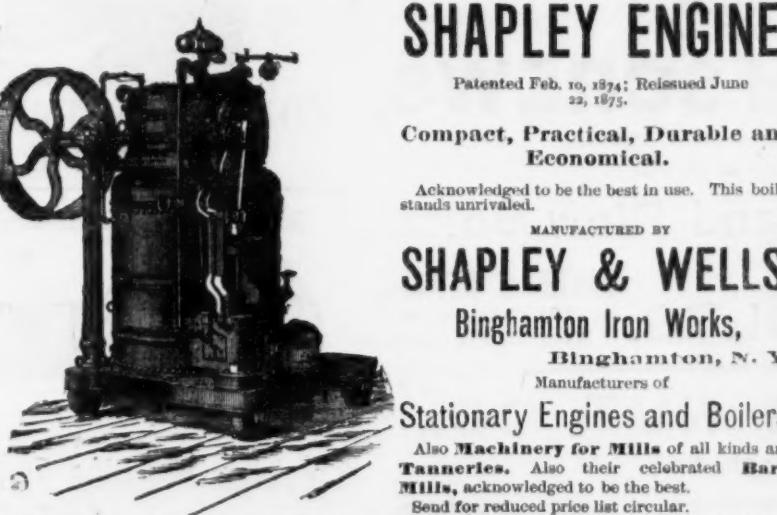


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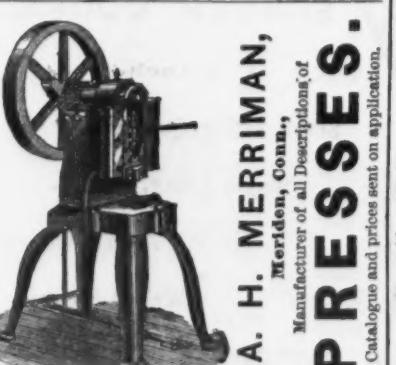
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